



**USAID**  
FROM THE AMERICAN PEOPLE

# **Competitiveness of Mozambique's Fisheries Sector**

June 2010

This publication was produced by Nathan Associates Inc. for review by the United States Agency for International Development.



# Competitiveness of Mozambique's Fisheries Sector

## **DISCLAIMER**

This document is made possible by the support of the American people through the United States Agency for International Development (USAID). Its contents are the sole responsibility of the author or authors and do not necessarily reflect the views of USAID or the United States government.



# Contents

<b>Acknowledgements</b>	<b>v</b>
<b>Acronyms</b>	<b>vii</b>
<b>Executive Summary</b>	Error! Bookmark not defined.
<b>1. Introduction</b>	<b>1</b>
<b>2. Overview of Findings</b>	<b>3</b>
Resources	3
Exports	3
Imports	3
Domestic Market	3
Processing	4
Losses	4
Quality	4
Political and Legal Environment	4
Recommendations	4
<b>3. Production and Market Conditions</b>	<b>7</b>
Domestic Production	7
External Trade	11
Foreign Trade	18
Mozambican Fisheries Exports and Imports	22
Conclusions	24
<b>4. Competitiveness Factors</b>	<b>27</b>
National Policies and Institutions	27
Economic Environment	28
Legal Environment	32
Technological Factors	35
Environmental Factors	37
Fishing Activity Management	38

Opportunities for Value Adding Investments and Interventions	40
<b>5. Recommendations</b>	<b>43</b>
Optimize Processing Subsector	43
Establish Export Market Database	43
Improve Incomes and Value Addition: Increase Producers' Incomes	44
Institute or Reform Policies	45
Investigate Investment Opportunities	46
Institute Crisis Management Measures	46

#### **Appendix A. Seafood Hazard Analysis Critical Control Point Regulation**

#### **Appendix B. World Fisheries Trade**

#### **Appendix C. International Markets for Shrimp**

#### **Appendix D. Prices of Shrimp in the United States, 2004-2008**

#### **Appendix E. Measures Relating to Turtle Conservation**

### **Illustrations**

#### **Figures**

Figure 3-1. Net Weight and Trade Value of Imports, 2004-2008	30
Figure 3-2. Sources of Fish and Fishery Imports, 2008	31
Figure 3-3. Principal Fish Exports and Destination Markets , 2008	33

#### **Tables**

Table 3-1. Total Fish Landings by Subsector, 2004-2008 (metric tons)	7
Table 3-2. Subsector Fish Production by Species or Groups, 2004-2008 (metric tons)	8
Table 3-3 .Fisheries Trade Balance, 2004-2008	12
Table 3-4. Quantity and Value of Fish and Fishery Exports and Imports, 2004-2008	12
Table 3-5. Quantity and Value of Fishery Exports by Principal Product Groups, 2004-2008	13
Table 3-6. Quantity and Value of Fishery Exports by Destination, 2004-2008	13
Table 3-7. Quantity and Value of Fishery Imports by Principal Product Groups, 2004-2008	14
Table 3-8. Quantity and Value of Fishery Imports by Supplying Country, 2004-2008	14
Table 3-9. Supply to Domestic Market, 2004-2008 (tons)	15
Table 3-10. Mozambican Population 1950-2000 and Projected Population 2010-2030 (millions)	15
Table 3-11. Trends in Per capita Food Fish Supply, 2004-2008	15

Table 3-12. Average Monthly Retail Market Prices of Important Species at Central Market in Maputo, 2007 and Average Retail Prices in Maputo Province, 2009 (MT/ kg)	16
Table 3-13. Monthly Average Wholesale and Retail Prices of Selected Species in Maputo Province, July 2008 (MT/kg)	16
Table 3-14. Relative Cost of Fish and Meat for One Meal for a Family of Four	17
Table 3-15. Value of World Imports of Fishery Products, by Leading Importing Countries, 1993-2007 (US\$ millions)	18
Table 3-16. Japanese Catches and Imports, 1989-2007	19
Table 3-17. US Commercial Landings for Direct Human Consumption and Imports of Edible Fishery Products, 1989-2008	21
Table 3-18. Nominal Catches of Leading European Countries, 1989-2006 (million tons)	23
Table 3-19. Volume and Value of Mozambican Fishery Exports, by Species, 2004-2008 (metric tons)	23





# Acknowledgements

The purpose of the Trade and Investment Project (TIP) is to increase access to international markets for Mozambican products, and enhance Mozambique's competitiveness by improving trade policy, creating a more supportive enabling environment, and by pursuing targeted interventions in specific sectors. TIP provides collaborative and demand-driven technical assistance to the Directorate of International Relations (DRI) and the private sector support office (GASP), through the Office for the Implementation of Commercial Protocols (UTCOM) at the Ministry of Industry and Commerce (MIC); to the Confederation of Mozambican Business Associations (CTA); and to other institutions as necessary. The writer of this study of Mozambique's fisheries sector, Robin Rackowe, wishes to express gratitude for the support provided by TIP staff and consultants, especially Ashok Menon (Director), Stelia Narotam (Lawyer, Intern) and Rouja Johnstone (Consultant). Mr. Rackowe visited Mozambique from September 13- October 10 2009, meeting with representatives of USAID, the Ministry of Fisheries and public and private stakeholders, and visiting fisheries harbours at Maputo and Beira. He also wishes to acknowledge the contributions of the following organizations:

- Arican Development Bank
- AQUAPESCA
- Armazens Garbriel Xavier da Barca
- Bazaruto Pescas
- Confederation of Mozambican Business Associations (CTA)
- Delegation of the European Commission in Mozambique
- National Directorate of Fisheries Administration (DNAP)
- Fisheries National Inspection Institute (INIP)
- Fisheries Working Group (Pelouro) of the CTA
- Food and Agriculture Organization of the United Nations (FAO)
- Fund for the Promotion of Fisheries (FFP)
- Icelandic International Development Agency (ICEIDA)
- Instituto Nacional de Desenvolvimento de Pesca de Pequena Escala (IDPPE)
- National institute for Fisheries Research (IIP)
- International Fund for Agricultural Development (IFAD)
- KRUSTAMAZ
- Ministry of Fisheries
- Ministry of Foreign Affairs of Denmark (DANIDA)
- Mozambique Export Promotion Institute (IPEX)
- National Directorate of Fisheries Economics (DNEP)
- National Institute for Aquaculture Development (INAQUA)
- PESCAMAR

- PESTRAI
- Sol Mariscos
- SSSS Ltd.

# Acronyms

AFD	Development Agency of France
APCM	Mozambique Prawn Producers Association
CPU	Catch per unit of effort
CSW	Chilled sea water
CTA	Confederation of Mozambican Business Associations
DNAP	Direcção Nacional de Administração Pesqueira
FAO	Organização das Nações Unidas Para Alimentação
GATT	General Agreement on Tariffs and Trade
HACCP	Hazard Analysis Critical Control Point
ICEIDA	Icelandic International Development Agency
IDPPE	Instituto Nacional de Desenvolvimento de Pesca de Pequena Escala
IIP	Instituto Nacional de Investigação Pesqueira
INAQUA	Instituto Nacional de Aquacultura
INIP	Instituto Nacional de Inspeção do Pescado
ITQ	Individual transferable quota
MCS	Monitoring, control and surveillance
MPEDA	Marine Products Export Development Authority (India)
MT	Meticais
NORAD	Norway Development Agency
RSW	Refrigerated sea water
SCM	Subsidies and countervailing measures
SPS	Sanitary and phytosanitary
TBT	Technical barriers to trade
<b>TED-</b>	<b>Turtle exclusion device</b>
<b>USFDA</b>	<b>United States Food and Drug Administration</b>



# 1. Introduction

Mozambique's fishing sector is already an important source of food, employment, and revenue for the country but its potential may not be fully tapped. At present, fishing operators complain of high operating costs. The oil crisis that began in 2004 and peaked in 2008 and the global financial crisis have had a very negative impact on fishing in Mozambique. As oil prices rose in 2008, more than half the country's 59 industrial fishing vessels ceased operations. The financial crisis has reduced international demand for fisheries products, depressing prices as well as trade volumes for fisheries products. The international price of shrimp, Mozambique's principal seafood export, has been especially affected. And there is reported to be a lack of capital for private and public investment in the sector.

This study of Mozambique's commercial fishing sector will assist the CTA in developing strategies to help unlock some of the sector's potential and determine policy measures to boost the competitiveness of Mozambican fishing entrepreneurs. The study assesses opportunities for investments and other interventions that will boost the competitiveness of Mozambique's fisheries sector in the global market and raise the incomes of those involved in the catch and sale of fish for the domestic market, as well value addition by supply chain participants.

Drawing on existing data and reports, as well as interviews of public and private stakeholders, the study examines the structure of the fishery industry, namely export markets, the legal and institutional framework, opportunities for investment and value-adding interventions, and environmental issues and opportunities. Recommendations pertain to supporting and promoting a more competitive sector and attracting investment, domestic and foreign.



## 2. Overview of Findings

### RESOURCES

Fishery resources in Mozambique are now described as having limited volume. Shallow water shrimp, the most commercially valuable national fishery, is considered fully exploited, while deepwater shrimp and other species offer potential for increased catches. The National Institute for Fisheries Research (IIP) has recommended that fishing for shallow water shrimp be reduced to 180,000-200,000 trawling hours per year. This will pressure companies to derive maximum yield in shorter periods, operating at maximum efficiency and optimizing boat maintenance, unloading, and other services. It will also intensify the need to diversify the fisheries exploited by each company in order to increase active fishing days of the vessels and reduce the risk inherent in depending on only one fishery.

### EXPORTS

In the 2004-2008 period Mozambique's exports of fisheries products decreased in quantity by 34 and in value by 41 percent. The decrease in value as compared to volume reflects the decline in unit prices of shrimp in international markets. Spain absorbs nearly half the value of these exports and the EU, the largest market for Mozambican fishery products, remains the government's most valuable economic partner. Rising population and purchasing power in the EU, Japan, and the United States will likely raise demand for fishery products, and that demand will have to be met mainly by imports, a situation favourable to exporting countries such as Mozambique. Exporters, however, must comply with increasingly stringent regulations intended to insure safe, wholesome, and honestly presented fishery products.

### IMPORTS

The domestic market is supplied by domestic production and imports. Mozambique's main suppliers are Namibia and South Africa, which in 2008 supplied US\$24.6 million in fisheries products, or 68 percent of the value of imports. In the period 2004-2008 imports increased by 50 percent in volume and 45 percent in value. The increase in volume, as compared to the increase in value, indicates that the unit price of imports has not increased.

### DOMESTIC MARKET

The buying and selling of fish and fisheries products in Mozambique is carried out by the private sector, operating in a free market, so that prices reflect supply and demand. The margins for trade intermediaries in the domestic market vary greatly between rural and urban areas. In rural areas mark-ups tend to be much less than in the urban markets. Nevertheless, competition in the marketing chain tends to ensure that margins are reasonable to the benefit of boat owners and fishermen as well as consumers.

In 2008, consumption of fish was 6.1 kg per capita. Maintaining this level of consumption by 2020 for a population of 26 million (projected) will require a 23 percent bigger supply of fish. Barring an unexpected surge in offshore and oceanic catches or in aquaculture production, more and more fish will have to be imported to keep prices within the reach of low-income consumers. More imports can be expected to depress fish prices as a whole and the incomes of fishermen and fish farmers.

## **PROCESSING**

In the domestic market, preference is for fresh fish in whole round form. Processing focuses on fisheries products that have remained unsold and on salvaging fish of poor quality. The quality and safety of processing for export appears to be adequately regulated and controlled.

## **LOSSES**

In artisanal fisheries, postharvest losses in value and quantity are believed to be relatively high. Loss levels vary with the catch volume and the ability to process and conserve unsold fish. Commercial fisheries did not make mention of postharvest losses.

## **QUALITY**

Market forces, not regulations, are determining factors for quality. For example, using ice to preserve catch on fishing vessels means that the quality of fish landed is superior. But if the price for iced fish is not sufficient to cover the cost of the ice then fishermen will use less of it or cease using it altogether. Artisanal boats generally do not take ice, and at the markets we visited most products were presented without ice. Government officials and private sector representatives agree that there is a shortage given the high price of ice and limited supply.

Given the expected rise in demand, prospects for improving fish quality do not look good. Buyers will find it increasingly difficult to persuade suppliers to improve or even to maintain quality when demand is high for fish of same or even lower quality. At the same time, a stronger market should curb postharvest losses as actors in the marketing chain see the economic value of better handling and other measures.

## **POLITICAL AND LEGAL ENVIRONMENT**

The Government of Mozambique is eager to support the competitiveness of the fisheries sector, but policy implementation is constrained by a lack of operational funds. Currently, there are no financing schemes dedicated to developing the capacity of the commercial fishing sector and port facilities need to be upgraded. The legal framework is progressive and developing in accord with international legal standards for the industry, as well as national demands. The licensing system and applicable charges are set out clearly in the legislation and provide the transparency needed for investment.

## **RECOMMENDATIONS**

- Adapt Mozambique's fleet to enable sustainable use of resources on the basis of fishery management plans.
- Provide aid for modernization schemes that give fishing companies incentive to use efficient vessels and fishing gear.



- Regulate the existing law on turtle exclusion devices (TEDs) to allow U.S. market access.
- Join the Indian Ocean Tuna Commission in order to obtain stock data and improve estimates of economic opportunities in the tuna fishery.
- Continue supporting common concerns, such as monitoring and enforcement.
- Provide technical assistance and training in export management.
- Create a database linking importers and exporters.
- Set up a “one-stop window” to simplify administration of fishery exports.
- Optimize species diversification in national waters on the basis of species management plans and estimated potential for expansion.
- Consider participating in multiday international long-line fishing as diversification from use of national resources.
- Improve access roads and availability of ice and chill storage to reduce losses in the artisanal value chain and stimulate distribution of higher value fresh fish across the country.
- Promote ice production and entry of new investors into ice production to increase supply and lower prices.
- Consider allowing fishing vessels to obtain access to fuel at international prices.
- Introduce individual transferable quotas (ITQs) to stimulate individual responsibility for resource management and control of fishing effort.
- Review license costs.
- Review private sector businesses management to identify which business models will enable companies to respond better to increased costs and falling prices for commodities and products.



# 3. Production and Market Conditions in Mozambique

## DOMESTIC PRODUCTION

In the 2004-2008 period, domestic fish production increased 34 percent. In 2008, 15 percent came from commercial fisheries, 84.3 percent from artisanal fisheries, and 0.6 percent from aquaculture (Table 3-1). The number of industrial, semi-industrial and artisanal vessels in the fleet, by type of fishing gear, is as follows:

<u>Type of Gear</u>	<u>Industrial</u>	<u>Semi-industrial</u>	<u>Artisanal</u>
<b>Trawl</b>	67	76	
<b>Hand lines</b>	2	30	
<b>Purse seine, tuna</b>	47		
<b>Long-line, tuna</b>	<u>76</u>		
<b>Total</b>	192	106	39,398

Tanganyika sardine (*kapenta*) was the most important species by volume for commercial vessels, accounting for 55 percent of production, followed by shallow water shrimp (*camarao*) (29 percent), and deep water shrimp (*gamba*) (8 percent). Fish (*peixe*) was the most important for artisanal vessels, accounting for 72 percent of production, followed by catch from inland fisheries (*peixe, aguas interiores*) (18 percent) (Table 3-2).

Table 3-1  
Total Fish Landings by Subsector, 2004-2008 (metric tons)

Subsector	2004	2005	2006	2007	2008
Commercial	30,210	26,248	27,926	19,377	18,437
Artisanal	60,379	57,747	63,973	72,894	103,364
Aquaculture	603	1,068	1,063	907	760
Total	91,191	85,063	92,962	93,178	122,561
Tuna	19,045	5,396	6,691	5,417	6,664

SOURCE: Five-year Report of Activities, 2004-2008 (Relatorio Quinquenal de Actividades 2004-2008)

While annual commercial production declined from 30,210 tons in 2004 to 18,437 tons in 2008, production by artisanal fisheries rose 71 percent, from 60,379 tons in 2004 to 103,364 tons in 2008. Aquaculture production has varied considerably, going from 603 tons in 2004 to 1,068 tons in 2005, then falling to 760 tons by 2008. Shallow water shrimp, the most commercially valuable resource, is fully exploited, while deepwater shrimp and other species offer potential for increased catches (see Exhibit 3-1).

Table 3-2

*Subsector Fish Production by Species or Groups, 2004-2008 (metric tons)*

Species	2004	2005	2006	2007	2008
<b>COMMERCIAL VESSELS(INDUSTRIAL AND SEMI-INDUSTRIAL),</b>					
Tanganyika sardine (kapenta)	18,760	12,991	16,017	8,882	10,055
Shallow water shrimp (camarao)	8,106	8,520	7,393	7,046	5,395
Deep water shrimp (gamba)	993	1,774	1,803	1,366	1,448
Fish (peixe)	484	660	665	764	649
Langoustine (lagostim)	132	149	94	153	100
Crab (caranguejo)	184	158	107	125	74
Cephalopods (cefalopodes)	195	165	114	138	42
Lobster (lagosta)	2	1	8	8	4
By catch (fauna acompanante)	1,354	1,830	1,725	895	670
Total	30,210	26,248	27,926	19,377	18,437
<b>ARTISANAL VESSELS</b>					
Shallow water shrimp (camarao)	3,783	4,555	1,367	838	2,087
Paste shrimp (acetes)			2,018	2,022	2,443
Fish (peixe)	51,908	50,024	57,457	45,511	74,870
Fish (peixe, aguas interiores), inland waters				15,199	18,331
Crab (caranguejo)	202	161	176	121	254
Cephalopods (cefalopodes)	255	239	247	551	773
Lobster (lagosta)			5	33	1
Shark (tubarao)	268	893	776	746	181
Others (outros)	3,962	1,875	1,926	2,351	2,156
By catch (fauna acompanante)				5,522	2,268
Total	60,379	57,747	63,973	72,894	103,364
<b>AQUACULTURE</b>					
Marine shrimp (camarao marinho)	450	1,067	995	693	602
Seaweed (algas marinhas)	149	0.2	15	69	70
Fish (peixe)	3	0	53	145	88
Total	603	1,068	1,063	907	760

SOURCE: *Five-year Report of Activities, 2004-2008 (Relatorio Quinquenal de Actividades 2004-2008)*

## Handling

Maintaining acceptable quality in fish requires good handling at sea, during unloading, and during sale at ports and landing sites and at wholesale markets and retail outlets. Data on postharvest losses is being collected, but data quality is dubious (IDPPE). It is the general view that losses are small when roads are good and electricity is reliable and that roads and electricity have improved in recent years. During times of heavy catches, physical losses may run to 20 percent to 30 percent; and when there is no chill room or processing facility, value losses may run as high as 50 percent.

## Exhibit 3-1

*Resource Status According to Mozambique's National Institute for Fisheries Research (IIP)*

---

**Shallow water shrimp.** The 2008 season was poor because of a cyclone; 2009 was better and resources seem to have recovered. For biological and economic reasons, the fishing effort should be reduced to 180,000-200,000 trawling hours. A study funded by the UN's Food and Agriculture Organization (FAO) for the National Directorate for Fisheries Administration (DNAP) will explore options for reducing the effort (due by end of 2009). The FAO is undertaking another study based on an ecosystem strategy (an approach to managing resources using scientific methods focused on levels of biological organization that encompass processes, functions, and interactions among organisms and their environment, and which recognizes humans as an integral part of that environment.) There is now a continuous closed season of six months. IIP had recommended two closed seasons each year, but the industry found that difficult to manage and preferred one continuous closed season. These matters are discussed in meetings of the Committee for Fisheries Administration. Cyclones are the main factor affecting the fishery but are beyond human control.

**Deep Water Shrimp.** This resource is in good condition. IIP recommends a catch of 3,000 t/year, but less is being taken. The industry prefers lobsterette (*lagoustim*), which lives with deep water shrimp. Small quantities of deep water crab (*caranguejo*) are taken only as by-catch.

**Lobster.** The stock has not recovered and the fishery is closed. Lobster is caught only as by-catch.

**Tuna.** Tuna vessels unload in Mauritius (not Mozambique) so there is little information on this resource. It would be helpful if Mozambique joined

the Indian Ocean Tuna Commission. IIP is considering the use of fish aggregating devices to test resources. In negotiating the next agreement with the EU, Mozambique should try to assert a requirement that tuna vessels pick up Mozambican inspectors from a Mozambican port before entering the fishery and return the inspectors when leaving Mozambican waters.

**Demersal Species (*sparids, groupers, snappers*).**

These resources are considered fully exploited along the southern coast, where no more licenses are being issued. The northern coast could yield more but lacks infrastructure. These high value species are exported mainly to South Africa and Portugal.

**Artisanal Fisheries.** This is the main source of fish for local consumption. The main species are shrimp, clams, and crabs. Sea cucumber is overexploited as are sharks for finning. Enabling artisanal fishermen to catch demersal species off-shore must be supported by infrastructure on land (e.g., landing jetties, supplies of ice, chill storage, processing facilities). Mangrove crab and squid can be exported, but also require infrastructure on land. Artisanal fishermen are often farmers as well and so fish only part time.

**Shrimp Fleet.** The shrimp fleet (chiefly, the big foreign-owned companies) has begun to diversify the resources targeted.

**Regulations.** Regulations are not always followed. Some artisanal fishermen do not stop fishing during the closed season and sometimes use mosquito nets, the mesh of which is smaller than the minimum permitted. Commercial fishing vessels sometimes fish in the area reserved for artisanal fishermen (from the coast out 3 miles).

---

**Handling at Sea**

No single system of at-sea preservation will meet the needs of all the vessels. One option is to box iced fish in the holds of semi-industrial vessels. Imprecisely fitting boxes might create dead space in the holds, but some loss of capacity might be acceptable given that these vessels are unlikely to fill their holds anyway. Boxed fish could be unloaded in the boxes to avoid direct handling. Boat owners would have to purchase boxes and alter hold layouts to ensure

safe stowage. In any event, fish quality would be maintained only for so long as there was sufficient ice to keep it cool.

Some fish may be too big for boxing. Shelves in the holds would make it possible to stow big fish in ice in bulk and reduce pressure on the fish from fish and ice stowed above it. Some semi-industrial vessels freeze fish at sea. Another possibility is the use of refrigerated sea water (RSW). In this system fish is held in sea water in the hold, with the sea water chilled by circulation through a refrigeration system. These systems are expensive and sometimes difficult to operate once the system inlet gets choked with scales, pieces of fish, and very small fish.

In a chilled sea water (CSW) system fish is held in a tank of sea water chilled with ice. This ensures that all fish are chilled and works well as long as there is a balance between the quantity of fish and ice. As ice melts, the temperature of the water and fish rise and more ice becomes necessary.

### ***Landing Sites***

Some auctions are conducted in the open at landing sites with no protection from the elements or from animals, birds, and insects. The standard of cleanliness at the sites is inadequate. Some sites have chill storage units that can hold unsold fish overnight and keep it in good condition for sale next day. Auction halls should be covered, enclosed, and clean. Fish displays should be raised off the floor. Chilled storage should consist of clean insulated rooms with no refrigeration equipment or air conditioning, in which fish are held in containers or boxes, on ice and re-iced as required, with adequate drainage for melt water. Care of chill rooms would be limited to maintenance of the building, inside and outside, since they would have no equipment.

### ***Boxes***

The IDPPE reports that most fish boxes or containers are plastic. Sacks may also be used, but wooden boxes are rarely used anymore. Stackable plastic boxes are easy to clean, handle, and store. They are the best option and fundamental to good fish handling, but may be relatively expensive. The use of sacks should be discouraged because sacks are hard to keep clean and put pressure on the fish.

### ***Transportation***

Fish is transported in trucks, in other open vehicles and by bicycle, head load and carried between two persons from the landing sites to the markets. The vehicles are not always clean. In bad weather roads become very difficult to navigate. Transportation of fish in insulated trucks, over the distances covered in Mozambique, is adequate, provided that the trucks are clean and that the fish is carried in ice in stackable boxes so that no pressure is exerted on the fish. Fish should not be transported in open, uninsulated vehicles.

### ***Processing***

Because the domestic market prefers fresh fish in whole round form, processing in Mozambique is mainly for exports and to salvage unsold and/or poor quality fish. Fish is processed for sale in fresh, frozen, and dried forms. Canned fish is no longer produced in Mozambique.

### **Export**

The quality and safety of processed fishery exports appear to be adequately regulated. The Regulation of Inspection and Guarantee of the Quality of Fisheries Products is contained in Decree number 10/98 of March 17. Decree 17/2001 of June 12 establishes hygiene, health, and management requirements for handling, processing, and export and import of fisheries products, with a view to protecting consumers and guaranteeing compliance with market requirements.

The EU has designated the National Institute of Fisheries Inspection (INIP) the Competent Authority. INIP inspects all stages in the flow of product (boats, landing sites, processing plants). Plants are inspected periodically and with greater frequency if problems are detected. Plants not in compliance have a period to achieve compliance. If they fail to comply, INIP may refuse them the health certificates required for export shipments and may close down plants that are seriously noncompliant.

In 2009 the INIP reported that 72 companies were authorized to export from Mozambique, of which 42 export shrimp. Of the authorized exporters, 25 are approved for export to the EU, 42 to other markets, and 5 to both the EU and other markets. Regulated land-based establishments include 32 processing plants, 3 cold storage facilities, and 2 ice factories. The INIP has inspected 156 vessels. All plants are reported to have installed HACCP food safety systems as required by law. Compliance with good manufacturing practices must be continually ensured.

### **Domestic Market**

Fish that are not good enough for local sale or for export are normally processed into dried fish. The number or capacity of domestic fish drying facilities is not known. Some facilities are curing yards where fish is salted; others consist of little more than fish drying in the sun on open ground. The products of the domestic processors are acceptable to local consumers, chiefly in rural areas, and there are no reported problems with safety or quality. Domestic processing is regulated under the same legal instruments as export processing.

## **EXTERNAL TRADE**

Mozambique is a net importer of fish and fishery products, with imports greatly exceeding exports in quantity. In value terms the trade balance is favorable but declined in the period 2004-2008 from US\$75.5 million to US\$23.4 million. The unit value of exports was greater than for imports during the period. By far the most important exports, frozen shrimps and prawns accounted for 81 percent of the value of Mozambique's fisheries exports in 2008. The principal destinations are Spain and Portugal which together accounted for 65 percent of the value of Mozambique's exports in 2008. Horse mackerel (*carapau*) is by far the dominant import, accounting for 97 percent of the value of Mozambique's fisheries imports in 2008. Namibia and South Africa, accounted for 68 percent of the value of Mozambique's fisheries imports in 2008. (See Tables 3-3 through 3-8.)

### **Supply to Domestic Market**

In the period 2004-2008, the supply of fish to the domestic market (domestic production and imports, less exports) increased 63 percent (see Table 3-9). In the same period domestic

production grew 34 percent and the trade balance (exports, less imports) went from 1,132 t positive to 9,476 t negative.

Table 3-3  
*Fisheries Trade Balance, 2004-2008*

Year	Exports		Imports		Trade Balance	
	Quantity (tons)	Value (US\$ 000)	Quantity (tons)	Value (US\$ 000)	Quantity (tons)	Value (US\$ 000)
2004	13,378	100,398	12,246	24,849	1,132	75,549
2005	14,645	86,504	15,486	28,151	-841	58,353
2006	15,793	96,627	15,996	29,214	-203	67,413
2007	10,520	70,107	13,938	24,895	-3,418	45,212
2008	8,834	59,536	18,310	36,143	-9,476	23,393

SOURCE: Derived from Table 3-2

Table 3-4  
*Quantity and Value of Fish and Fishery Exports and Imports, 2004-2008*

Year	Exports			Imports		
	Quantity (tons)	Value (US\$ 000)	Avg. unit value (US\$/kg)	Quantity (tons)	Value (US\$ 000)	Avg. unit value (US\$/kg)
2004	13,378	100,398	7.50	12,246	24,849	2.03
2005	14,645	86,504	5.91	15,486	28,151	1.82
2006	15,793	96,627	6.12	15,996	29,214	1.83
2007	10,520	70,107	6.66	13,938	24,895	1.79
2008	8,834	59,536	6.74	18,310	36,143	1.97

SOURCE: Ministry of Industry and Trade.

## Consumption and Population

The population of Mozambique quadrupled between 1950 and 2000, and is projected to reach 22.06 million in 2010 and 31.34 million in 2030 (see Table 3-10). As a consequence largely of increases in domestic production, the supply of fish has grown faster than the rate of increase in population; annual per capita supply increased by 36 percent from 4.5 kg in 2004 to 6.1 kg in 2008 (Table 3-11). While not unimportant in the Mozambican diet, fish is consumed at an average rate much lower than the world average of 16.4 kg (Fisheries of the United States, 2008).

## Prices

In the 2007-2009 period, the average monthly retail prices in Maputo increased for nearly all important commercial species (Table 3-12). The monthly average wholesale and retail prices showed an average mark up from wholesale to retail of 139 percent. The retail price for Tiger prawns was nearly seven times the wholesale price (Table 3-13).



Table 3-5

*Quantity and Value of Fishery Exports by Principal Product Groups, 2004-2008*

Product	2004		2005		2006		2007		2008	
	Net weight (tons)	Trade value (\$ '000)	Net weight (tons)	Trade value (\$ '000)	Net weight (tons)	Trade value (\$ '000)	Net weight (tons)	Trade value (\$ '000)	Net weight (tons)	Trade value (\$ '000)
Frozen shrimps and prawns	5,548	91,506	11,686	71,671	14,066	86,269	9,618	61,691	7,311	48,287
Other dried fish	4,863	3,238	463	2,263	597	2,920	-	1,825	248	1,589
Other frozen crustaceans	131	1,242	611	4,491	187	1,371	134	1,251	74	752
Other fresh fish	396	1,108	-	1,712	-	1,489	357	1,861	451	2,921
Frozen crabs	403	1,205	267	1,882	183	1,289	194	1,446	191	1,529
Others	2,037	2,099	1,618	4,485	760	3,289	217	2,033	559	4,457
Grand Total	13,378	100,398	14,645	86,504	15,793	96,627	10,520	70,107	8,834	59,536

SOURCE: Ministry of Industry and Trade.

Table 3-6

*Quantity and Value of Fishery Exports by Destination, 2004-2008*

Destination	2004		2005		2006		2007		2008	
	Net weight (tons)	Trade value (\$ '000)	Net weight (tons)	Trade value (\$ '000)	Net weight (tons)	Trade value (\$ '000)	Net weight (tons)	Trade value (\$ '000)	Net weight (tons)	Trade value (\$ '000)
Spain	2,035	36,902	5,236	31,898	6,959	42,638	4,939	31,681	4,169	28,378
Portugal	1,519	33,375	2,742	17,258	3,551	22,327	2,594	16,702	2,276	14,998
South Africa	3,436	9,703	2,778	14,950	2,677	16,364	1,324	9,156	1,130	8,012
Japan	547	7,724	1,391	8,562	886	5,509	178	1,150	316	2,233
France & Monaco	232	2,180	746	4,576	511	3,131	173	1,109	90	604
Others	5,610	10,513	1,753	9,259	1,209	6,658	1,312	10,309	853	5,312
Grand Total	13,378	100,398	14,645	86,504	15,793	96,627	10,520	70,107	8,834	59,536

SOURCE: Ministry of Industry and Trade.

Table 3-7

*Quantity and Value of Fishery Imports by Principal Product Groups, 2004-2008*

Product	2004		2005		2006		2007		2008	
	Net weight (tons)	Trade value (\$ '000)	Net weight (tons)	Trade value (\$ '000)	Net weight (tons)	Trade value (\$ '000)	Net weight (tons)	Trade value (\$ '000)	Net weight (tons)	Trade value (\$ '000)
Frozen horse mackerel	11,925	24,653	15,321	27,905	15,813	28,801	13,735	24,268	17,684	34,936
Fresh sardines	164	58	59	55	40	37	67	100	117	156
Frozen sardines	74	31	32	22	19	13	36	25	354	253
Frozen shrimps and prawns	2	0	0	1	0	1	33	209	0	2
Frozen cod	0	0	0	1	0		0		0	205
Other products	80	107	74	168	123	361	66	292	155	591
Total	12,246	24,849	15,486	28,151	15,996	29,214	13,938	24,895	18,310	36,143

SOURCE: Ministry of Industry and Trade,

Table 3-8

*Quantity and Value of Fishery Imports by Supplying Country, 2004-2008*

Country of Origin	2004		2005		2006		2007		2008	
	Net weight (tons)	Trade value (\$ '000)	Net weight (tons)	Trade value (\$ '000)	Net weight (tons)	Trade value (\$ '000)	Net weight (tons)	Trade value (\$ '000)	Net weight (tons)	Trade value (\$ '000)
Namibia	7,666	16,757	11,631	21,178	10,746	19,572	8,247	14,571	7,270	14,363
South Africa	4,365	7,944	2,551	4,656	2,682	4,922	2,828	5,078	5,233	10,195
New Zealand	17	30	245	447	1,985	3,614	1,179	2,083	2,260	4,465
Spain	0	7	440	802	168	305	374	652	419	827
China	38	13	0		0		197	348	748	1,485
Others	161	99	619	1,068	416	800	1,113	2,163	2,381	4,808
Grand total	12,246	24,849	15,486	28,151	15,996	29,214	13,938	24,895	18,310	36,143

SOURCE: Ministry of Industry and Trade.

Table 3-9

*Supply to Domestic Market, 2004-2008 (tons)*

Year	Domestic Production	Imports	Exports	Supply
2004	91,191	12,246	(13,378)	90,059
2005	85,063	15,486	(14,645)	85,904
2006	92,962	15,996	(15,793)	93,165
2007	93,178	13,938	(10,520)	96,596
2008	122,561	18,310	(8,834)	132,037

*SOURCES: Derived from Tables 3-1 and 3-2.*

Table 3-10

*Mozambican Population 1950-2000 and Projected Population 2010-2030 (millions)*

Year	Population
1950	6.4
1960	7.6
1970	9.4
1980	12.1
1990	13.4
2000	17.9
2004	20.1
2005	20.5
2006	21.0
2007	21.4
2008	21.8
<b>PROJECTED</b>	
2010	22.1
2020	26.5
2030	31.3

*SOURCE: Africapedia; and World Development Indicators, World Bank.*

Table 3-11

*Trends in Per capita Food Fish Supply, 2004-2008*

Year	Supply (000 tons )	Population (millions)	Per capita Supply ( kg)
2004	90,059	20.1	4.5
2005	85,904	20.5	4.2
2006	93,165	21.0	4.4
2007	96,596	21.4	4.5
2008	132,037	21.8	6.1

*SOURCES: Derived from Tables 3-9 and 3-10.*

Table 3-12

*Average Monthly Retail Market Prices of Important Species at Central Market in Maputo, 2007 and Average Retail Prices in Maputo Province, 2009 (MT/ kg)*

Species	Central Market, Maputo July 2007	Maputo Province July 2009
Frozen		
Horse mackerel (carapau), imported, large	48	nq
Horse mackerel (carapau), imported, medium	43	nq
Horse mackerel (carapau), local	nq	59
Squid (lula)	80	nq
Fresh		
King mackerel (serra)	95	140
Shrimp, large (camarao grande)	200	nq
Shrimp, small (camarao pequeno)	100	nq
Tiger prawns (camarao Tigre)	nq	442
Shrimp, small (camarao fino)	nq	83
Clams (ameijoas)	23	50
Squid (lula)	95	106
Mud crab (caranguejo)	65	56
Snapper (vermelho)	100	137

*Nq = not quoted*

*SOURCE: IDPPE, Monthly Information on the National Market for Fish.*

Table 3-13

*Monthly Average Wholesale and Retail Prices of Selected Species in Maputo Province, July 2008 (MT/kg)*

	Wholesale	Retail
Horse mackerel (carapau), local	33	59
Squid (lula)	83	107
King mackerel (serra)	81	140
Tiger prawns (camarao Tigre)	65	442
Shrimp, small (camarao fino)	46	83
Clams (ameijoas)	20	50
Mud crab (caranguejo)	31	56
Snapper (vermelho)	90	134

*SOURCE: IDPPE, Monthly Information on the National Market for Fish.*

Consumers prefer fresh fish of national origin but will buy good imported fish (chiefly frozen), which is cheaper than fresh local catch. Fish is sold by weight, and prices are determined by supply and demand. As a general rule large fish cost more than small fish. Consumers eat fish all year round, so price fluctuations are caused by variations in supply not demand. Consumer purchases, however, are influenced by other factors as well as price. Feeding a family of four requires about 1,100 g of chicken; 1,500 g of beef, 615 g of fresh fish; or 1,000 g of imported frozen fish (Table 3-14). When prices are taken into account, the

relative cost (where frozen imported fish = 100) of the center- of-the-plate items for such meals is as follows:

- Frozen imported fish      100
- Chicken                      259
- Fresh fish                    571
- Beef                            587

Table 3-14

*Relative Cost of Fish and Meat for One Meal for a Family of Four*

Product	Weight Purchased (kg)	Purchase Price (MT/kg)	Cost (MT)	Unweighted Average	Relative Cost
Horse mackerel (carapau), imported	1.0	42-50	42-50	46	100
Vermillion snapper (peixe vermelho)	1,5-2.0	150	225-300	263	571
Chicken, imported, frozen, Brazil	1,1	95-120	105-132	119	259
Beef (vaca)	1.5	180	270	270	587

*SOURCE: Unstructured interview with project staff.*

## Quality

Not all fish in Mozambique is produced to good standards. Poor handling and storage—on vessels and during unloading, handling and transport, and at the market—degrades quality. Constraints on quality include insufficient ice and lack of protection and cleanliness during handling, transportation, and selling. Some initial handling sites, such as harbors and landing sites, are unsanitary. Conditions at markets in Maputo and Beira are very poor, and some fish is sold at ground level without ice or protection from the elements, flies, birds, and animals.

## Ice Shortage

Government officials and representatives of the private sector agree that there is a shortage of ice. Most ice producers we interviewed sell only to boats for which they deliver catches and at very high prices, US\$ 93-185/t (MT 2.5-5,0/kg) versus the world price of US\$15-25/t. Government representatives (IDPPE, personal communication) point out that the lack of electricity in many areas contributes to the shortage and believe the use of ice is not profitable for artisanal fisheries.

## Selling Arrangements

Most fish changes hands several times before it reaches consumers or final users. Vessel owners sell catch at the landing sites to private buyers, most of whom are intermediaries who provide boxes and ice for transport to markets. At the markets fish is sold to consumers or to wholesalers for distribution. Most fish are sold and consumed in fresh form. There is some production of frozen fish for the local market.

## FOREIGN TRADE

World imports of fishery commodities increased in value by 75 percent from 1997 to 2007 (Table 3-15). In 2007, Japan, the United States, and the EU together accounted for 56 percent of the value of world imports.

Table 3-15

*Value of World Imports of Fishery Products, by Leading Importing Countries, 1993-2007 (US\$ millions)*

Country/ Region	1993	1999	2002	2003	2004	2005	2006	2007
<b>Asia</b>								
Japan		14,749	13,646	12,396	14,560	14,438	13,971	13,242
China		1,127	2,198	2,389	3,126	3,979	4,126	4,538
South Korea		1,140	1,861	1,935	2,233	2,351	2,729	3,108
United States		9,405	10,065	11,655	11,967	11,982	13,271	13,664
<b>EU</b>								
France		3,281	3,207	3,771	4,176	4,562	5,069	5,388
Spain		3,287	3,853	4,904	5,222	5,632	6,359	6,988
Italy		2,729	2,906	3,559	3,904	4,224	4,717	5,160
Germany		2,289	2,420	2,635	2,805	3,235	3,739	4,298
United Kingdom		2,277	2,328	2,508	2,812	3,174	3,714	4,158
Denmark		1,772	1,806	2,085	2,286	2,555	2,838	3,018
<b>Other</b>							29,073	35,861
<b>Total</b>	44,567	57,684	61,604	67,359	75,436	81,529	89,607	99,423

SOURCE: *Fisheries of the United States*, 2007 and earlier editions.

## Japan

**Domestic Production.** Japanese aquaculture and commercial catch production declined from 11.9 million tons in 1989 to 5.2 million tons in 2007 (Table 3-16). This decline was concentrated in sardine catch, which went from 3.7 million tons in 1990 to 0.06 million tons by 2003. A good portion of this catch was used to make fishmeal and Japan has since been importing fishmeal from major producers such as Chile and Peru. Catches of Alaskan pollock declined from 0.9 million tons in 1990 to 0.3 million tons in 2003, partly because Japanese fishing vessels were excluded from traditional fishing grounds in the northern Pacific. Catches of squid dropped from 0.6 million tons in 1990 to 0.4 million tons in 2003.

**Imports.** In 2008, Japan imported fishery products with a value of JPY1,563,655 million, down 4.4 percent from JPY1,636,175 million in 2007. The leading group of products, by value, was shrimp and prawn (11.7 percent), followed by salmon and trout (8.3 percent). Reflecting national economic difficulties, the value of imports of fish and fisheries products declined from US\$18,445 millions in 1995 to US\$12,396 millions in 2003, then recovered slightly in 2007 (Table 3-16). Until 2007, Japan was the world's leading importer of fish and fishery products; the lead importer is now the United States. Even if Japan's economy recovers it is unlikely that demand for imported fisheries products will revert to earlier levels as other foods are eroding seafood's share of Japan's food market.

Table 3-16  
*Japanese Catches and Imports, 1989-2007*

Year	Aquaculture and Commercial Catches (million tons)	Imports into Japanese Market	
		Quantity (million tons)	Value (US\$ millions)
1989	11.9	2.3	10,127
1991	10.0	2.9	12,085
1993	8.7	3.1	14,187
1995	6.8	2.8	17,853
1997	6.7	2.8	15,540
1999	6.0	2.9	14,749
2000	5.8	3.0	15,513
2001	5.5	3.1	13,453
2002	5.2	3.1	13,646
2003	5.4	2.8	12,396
2004	5.4	2.9	14,560
2005	5.3	2.8	14,438
2006	5.3	2.6	14,025
2007	5.2	2.4	13,242

*SOURCES: Japanese Imports of Marine Products (Statistics), Japan Marine Products Importers Association; Annual Report on the United States Seafood Industry, various editions; Fisheries of the United States, various editions; and FAO Fisheries Yearbook, various editions.*

In 2008 Japan imported 316 tons of fishery products valued at US\$2.2 million from Mozambique. In that year, 4.1 percent of Mozambique's fisheries exports—by volume and value—went to Japan.

**Consumption.** Japanese consumers prefer locally sourced species and products to which they are accustomed. Imported species tend to be thought of as substitutes for domestic species. Fish caught by Japanese vessels often fetch higher prices than fish caught by other vessels because the catches are more likely to have been handled and preserved as required by Japanese trade and consumers. Marine species are preferred over freshwater species.

Japan's seafood products are increasingly processed in countries with lower labor and other costs associated with processing. Such processing often occurs under joint venture arrangements with Japanese retailers (department stores, supermarkets). These products are exported to Japan in semi-processed form or prepared for direct sale to final users (consumers, institutional buyers)

**Regulation.** Japanese authorities will intervene when imported fishery products present health risks (e.g., unauthorized additives, cholera), but the main difficulty facing exporters is satisfying consumers' requirements for freshness, presentation, and correct workmanship. Nevertheless, it is likely that Japan will impose a Hazard Analysis Critical Control Point (HACCP) system as have the United States, the EU, and Canada (see Exhibit 3-2).

## Exhibit 3-2

*Hazard Analysis Critical Control Point*

---

The Hazard Analysis Critical Control Point (HACCP) system is the basis for fish inspection regulations in the United States, the EU, Canada, and a number of developing countries. The object of the system is to ensure the safety and sensory quality of fishery products and reduce failure costs in the fishery industry, including costs associated with postharvest loss. The main elements of the HACCP regulation for seafood promulgated by the U.S. Food and Drug Administration are as follows:

- Identification of potential hazards and assessment of the risk that they may occur.
  - Determination of critical control points and steps that can be taken to eliminate or minimize hazards.
  - Establishment of criteria, target levels and tolerances that must be met to ensure that each critical control point is in fact under control.
  - Establishment of a monitoring system for each critical control point.
  - Determination of corrective action to be taken when a control point is not under control.
  - Establishment of procedures for verification.
- 

**United States**

**Production and Imports.** Commercial landings of edible species by U.S. fishing vessels increased from 2.8 million tons in 1989 to 3.7 million tons in 1993, declined to 3.1 million tons in 1999, then increased to 3.4 million tons in 2007 (Table 3-17). As catches increased in 1989-1993 the volume of imports of edible species declined from 1.5 million to 1.3 million tons, but then increased as catches trended down to 3.4 million tons in 2007.

The value of imported products increased by two and a half times, from US\$5,498 millions in 1989 to US\$13,696 millions in 2007, despite an increase in U.S. catches of 21 percent.

In the United States, as in Japan, the top imports are fresh and frozen shrimp. In 2007 the value of imported shrimp was US\$4,093 million, or 29 percent of the value of edible fisheries imports. The prices paid for fresh (chilled, unfrozen) fish are generally higher than those paid for the same species in frozen form.

**Consumption.** As in Japan and elsewhere, U.S. consumers and the trade prefer the species to which they are accustomed. In contrast to Japanese consumers, U.S. consumers seem to know less and be less demanding about fish and to prefer bland, white, boneless fish. After some adaptation to U.S. market requirements and preferences, for example, tilapia and catfish have claimed an increasing share of the market (see Exhibit 3-3). In general, however, these fish gained acceptance in the U.S. market in the face of shortages of other well-known species, such as cod.



Table 3-17

*US Commercial Landings for Direct Human Consumption and Imports of Edible Fishery Products, 1989-2008*

Year	US Commercial Landings Human Food (million tons)	Imports of Edible Fisheries Products	
		Quantity (million tons)	Value (US\$ millions)
1989	2.8		
1993	3.7		
1999	3.1	1.8	9,014
2000	3.1	1.8	10,054
2001	3.3	1.9	9,864
2002	3.3	2.0	10,121
2003	3.4	2.2	11,095
2004	3.5	2.2	11,331
2005	3.6	2.3	12,099
2006	3.5	2.4	13,355
2007	3.4	2.4	13,696
2008	3.0	2.4	14,171

SOURCE: *Fisheries of the United States, various editions.*

**Regulation.** U.S. domestic industry and exporters in other countries who ship fishery products to the U.S. market must implement an HACCP system (Appendix A) and meet certain absolute standards for quality (e.g., chemical additives, heavy metals, coloring agents, levels of decomposition). These standards are normally set by U. S. importers or negotiated by them with their overseas suppliers. Among other things, the U.S. Food and Drug Administration (USFDA) is responsible for ensuring that seafood imports are not adulterated or misbranded such that consumers become ill or are led to believe they are buying another product. The USFDA inspects fishery imports at random at ports of entry. Shipments from suppliers or exporting countries whose products have been rejected by USFDA may be subject to more frequent inspection. Initial shipments from new suppliers are usually all inspected.

The United States is not a leading destination for Mozambique's fishery exports, partly because Mozambique has not yet obtained U.S government certification of turtle excluder devices (TEDs). With such certification Mozambique would be permitted to export shrimp to the United States.

## European Union

The EU is a very large market whose member countries have widely differing preferences and needs. Common duty rates are applied to fishery products that enter from outside the EU, while member countries are working to harmonize nontariff rules and regulations. Within the EU, fishery products trade freely between member countries.

## Exhibit 3-3

*Rise of Tilapia and Catfish in the U.S. Market*

In the 1970s and 1980s, U.S. consumers showed no interest in tilapia even though it was cheaper than well-known species. The trade claimed that tilapia did not sell for several reasons. Consumers were not familiar with it, preferred the taste of fish from the sea, did not like fish with too many bones, and disliked tilapia's "muddy" taste. The taste problem has been solved by purging farmed fish (e.g., not feeding the fish for a certain period of time before harvesting). Tilapia's reputation was not helped by the activities of some US traders, who tried to pass red tilapia off as red snapper in order to charge higher prices.

Interest in tilapia increased when fisheries in Canada and the northeastern United States closed or limited the cod catch to regenerate supply. By 1999 the prices of skinless, boneless tilapia fillets had weakened somewhat, but were still close to those of cod in the same form.

Domestic production and imports—chiefly from farms in Latin America and Asia—have since grown rapidly. That tilapia are a good source of eco-friendly protein also makes them attractive to U.S. consumers. In 2004,

however, the two largest natural foods supermarket chains in the United States (Whole Foods, Wild Oats) removed the fish from their stores on learning that farmers use a hormone to produce all-male tilapia populations. (In mixed populations tilapia spend their energy in reproduction, instead of growth. By introducing methyl testosterone into the diet, farmers made the population about 90 percent male.) Sales to these supermarket chains account for only a small portion of sales but tilapia farmers are considering other options, such as sexing tilapia by hand (a slow and expensive process).

Like Tilapia, catfish is a white flesh fish. Unlike tilapia is has virtually no bones—just a backbone. For a long time catfish was only consumed in the southern United States by low-income groups. Farmed catfish is now sold throughout the country thanks to cooperative promotional work, the development of processed products, and reasonable pricing policies. Tilapia producers, following the example of the catfish industry, are starting to produce more value-added tilapia products (such as marinated frozen fillets) to expand sales.

In the 1989-2003 period, the nominal catches of the eight leading European fishing nations were in a downward trend. Catches reported for 2006 were 31 percent lower than the catches in 1989 (Table 3-18). During the 1997-2007 period, the value of fishery products imported by the top six importing countries increased 32 percent, from US\$14,730 millions to US\$19,462 millions (Table 3-15).

The EU is Mozambique's principal export market for fisheries products. In 2008, Spain and Portugal imported 6,445 tons of products from Mozambique valued at US\$43,376 million, or 65 percent of the value of Mozambique's exports. The EU has introduced an HACCP system that must be implemented by overseas exporters shipping to the countries of the EU.

## MOZAMBIKAN FISHERIES EXPORTS AND IMPORTS

Exports declined by 34 percent in quantity and 41 percent in value in the 2004-2008 period. In 2008, Mozambique exported 8,834 tons of fisheries products valued at US\$59.5 million (Table 3-19)—81 percent of the value was in shallow water shrimp and deep water shrimp. The main export species is destined mostly for Europe and South Africa. In value terms, Spain is the main destination, accounting for 45 percent of fish and fisheries products

exported by Mozambique in 2007 and 48 percent in 2008 (Table 3-19). In volume terms, Mozambique is not a significant player, accounting for only 0.06 percent of world exports of fish and fishery exports in 2007.

Table 3-18

*Nominal Catches of Leading European Countries, 1989-2006 (million tons)*

	1989	1997	2000	2001	2002	2003	2004	2005	2006
Denmark		1.8	1.5	1.5	1.4	1.0	1.1	0.9	0.9
Spain		1.2	1.0	1.1	0.9	0.9	0.8	0.8	0.9
United Kingdom		0.9	0.7	0.7	0.7	0.6	0.7	0.7	0.6
France		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Netherlands		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4
Italy		0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Portugal		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Germany		0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.3
Total (8 countries)	6.1	5.8	5.0	5.1	4.8	4.4	4.5	4.3	4.2

SOURCE: FAO Yearbook of Fisheries Statistics, Summary Tables, Capture Production.

Table 3-19

*Volume and Value of Mozambican Fishery Exports, by Species, 2004-2008 (metric tons)*

Species	2004		2005		2006		2007		2008	
	MT	(US\$ 000)	MT	(US\$ 000)	MT	(US\$ 000)	MT	(US\$ 000)	MT	(US\$ 000)
Tanganyika sardine	5,149	6,179	3,615	4,337	5,071	7,607	2,289	2,747	2,201	2,641
Shallow water shrimp	904	4,520	1,565	7,820	1,881	9,405	1,460	7,300	1,428	7,140
Deep water shrimp	9,084	72,671	9,414	75,310	8,670	69,360	7,760	62,080	5,021	40,165
Fish	607	1,517	329	823	280	700	478	1,195	907	2,268
Langoustine	117	1,165	102	1,025	136	1,360	132	1,320	86	864
Crab	192	575	324	972	376	1,128	432	1,253	385	1,118
Cephalopods	203	506	165	414	39	98	21	53	2530	64
Lobster	30	334	10	117	8		8	88	10	112
Cultured shrimp	214	1,286	1,017	6,106	531	3,186	668	4,010	202	1,213
Seaweed	92	110	36	43					52	1,035
Others									704	352
Total	16,592	88,863	16,577	96,967	16,992	92,844	13,249	80,046	11,022	56,971

SOURCE: Five-year Report of Activities, 2004-2008 (Relatorio Quinquenal de Actividades 2004-2008).

Imports of fishery products are significant in the Mozambican market. In 2008 Mozambique imported products valued at US\$36.1 million. Frozen horse mackerel (*carapau*) accounted for 97 percent of this value. Mozambique's principal suppliers are Namibia and South Africa. In 2008 imports from these countries were valued at US\$24.6 million, or 68 percent of the value

of Mozambican imports. Mozambique accounts for only 0.05 percent of the value of world imports of fish and fisheries products (2007).

## **CONCLUSIONS**

### **Commercially Important Species**

In 2008 four groups of species accounted for 94 percent of Mozambique's domestic marine production of fish and shellfish: marine species, fish from inland waters, shallow water shrimp, and Tanganyika sardines. Imported frozen horse mackerel supplements local production and has a big share of the domestic market.

### **Domestic Demand and Prices**

Prices fluctuate with supply. The supply of fish increased from 4.5 kg per capita in 2004 to 6.1 kg per capita in 2008 and has outpaced growth in population. Given projected population growth to 26.5 million by 2020, maintaining this level of consumption will require a 23 percent bigger supply. Monthly retail prices of nearly all important species increased over the 2007-2009 period. Barring an unexpected surge in aquaculture production or offshore and oceanic catches, more fish will have to be imported to keep prices within reach of low-income consumers. This will depress prices overall and the incomes of fishermen and fish farmers.

Trade intermediaries in the fish and fishery supply chain perform useful functions (e.g., financing producers, providing credit to customers, ensuring a ready market, transporting goods). Trade margins for intermediaries are not excessive by international standards and competition keeps margins reasonable to the benefit of boat owners and fishermen, as well as consumers. When fishermen can manage without intermediaries, however, they get a bigger share of retail prices.

### **Quality**

Producers, trade intermediaries, processors, and others in the marketing chain respond more to economic incentives than to rules and regulations. For example, when ice is used on vessels to preserve catch the quality of fish landed is superior. But if the price for fish does not cover the cost of the ice then less or no ice will be used. In other words, market forces, not regulations, are determining factors for quality. Actors in the marketing chain supply only the quality needed to sell; higher quality makes no economic sense if the cost incurred is not compensated for by a correspondingly higher price. Thus, given the expected rise in demand, prospects for fish quality do not look good. Buyers will find it increasingly difficult to persuade suppliers to improve or even to maintain quality when demand is high for fish of same or even lower quality. Even so, a stronger market should curb post-harvest losses as the economic value of better handling and other measures becomes evident. It is agreed that there is a shortage of ice and that the lack of electricity along many parts of the coast constrains ice production.

### **Postharvest Losses**

Losses in weight and quality may occur from the time fish are harvested until they are marketed, chiefly as a result of inadequate handling. There are no precise estimates of these

losses in Mozambique, but the IDPPE believes that losses are small when roads are good and electricity reliable, and this infrastructure has been improving. Even though data are uncertain, the general opinion is that physical losses may run to 20-30 percent, especially at times of heavy catches. Where there is no chill room or processing facility, the losses in value may be as much as 50 percent.

To curb losses, producers should box iced fish. When fish is iced in bulk in the holds, the weight of the fish and ice puts pressure on the fish underneath, degrading quality. Boxing and icing fish at sea would better conserve the fish and allow for undisturbed handling of the fish in the boxes upon arrival at the port. Shelving can be used for fish too big for boxing. How much ice to how much fish (usually a 3 to 1 ratio) is chiefly an economic calculation in Mozambique. Boat owners will use more ice if the price of the fish will, at the very least, cover the cost of the ice. Exhibit 3-4 summarizes other ideas for curbing postharvest losses that could apply in Mozambique.

#### Exhibit 3-4

##### *Recommendations for Curbing Postharvest Losses in Sri Lanka*

---

Reduce the soaking time of nets to few hours.	distribution chain. (Boxed iced fish need not be re-iced.)
Ice catch immediately and provide shade during onboard handling.	Do not use discarded ice from boats in fish transport vehicles. This ice leads to cross contamination.
Use quaternary ammonium disinfectants to clean holds and prevent microbial loads. Make cleaning procedures complete and do not use polluted water.	Provide adequate shelter and space for different fish handling activities.
Keep areas for handling fish and for preparing crew meals separate. Make crew aware of sanitary requirements.	Construct barriers to keep stray animals away from catch.
After unloading, re-ice fish to maintain quality and low temperature continuity along the handling and	Supply potable water at the landing site and easy access to ice.
	Inform fish traders of correct handling practices.

---

*Source: Sri Lanka National Aquatic Resources Research & Development Agency (NARA).*

## Foreign Markets

The world's three major markets are importing more fish, whether compensating for declines in domestic production (Japan, EU) or despite an increase in domestic catches (United States). It seems unlikely that domestic production in these markets, except possibly from aquaculture, will grow—and may even decline. Growth in population and in purchasing power will raise demand that will have to be met by imports. Exporters, however, must meet increasingly strict regulations intended to ensure that fishery products are safe, wholesome, and honestly presented. Traditional fish inspection and quality control methods, based on analysis of finished products, are being replaced by HACCP systems, and exporters must implement such systems if they wish to export to the EU, Canada, and the United States.



# 4. Competitiveness Factors

## NATIONAL POLICIES AND INSTITUTIONS

The Ministry of Fisheries has benefited from capacity strengthening programs and direct support of the fisheries sector development. Financial and technical aid has focused on the artisanal subsector, while commercial fisheries have benefited from better management and control of fisheries. Currently, no financing schemes are dedicated to developing the capacity of the commercial fishing sector and port facilities are in urgent need of upgrading. Despite these difficulties, with external assistance, the government has enabled the fisheries administration to respond to international legal and trade requirements permitting commercial fisheries access to export markets, such as the EU. It has created a national monitoring control and surveillance (MCS) program and established the National Institute of Fisheries Inspection (INIP) to deal with the regional and international requirements pertaining to product health and safety.

The EU is the biggest export market for Mozambican fisheries products and, through lucrative trade agreements that grant it access to the tuna fisheries of Mozambique, contributes to state revenue derived from the sector. The government also has an agreement with Namibia, based on joint ventures, that provides access to nationally set quotas for deep water shrimp in Mozambique and horse mackerel in Namibia. So far there is only one example of such a private sector agreement. In sum, Mozambique is interested in and has the political will necessary to support the competitiveness of the fisheries sector but a lack of operational funds limits its capacity to implement policy.

## Fishery Sector Support Programs

No government funds are dedicated to commercial fishing but the Ministry of Fisheries is working with the Norwegian Development Agency (NORAD) and the Iceland International Development Agency (ICEIDA) to increase the value of the sector to the national economy. NORAD is helping to develop fisheries administration and to respond to the National Fisheries Sector Development Plan. Program objectives include increasing the contribution of

- Industrial fisheries and commercial aquaculture to reducing poverty, and
- The overall sector to the country's balance of payments, within a framework of sustainability of fisheries resources and of environmental equilibrium.

ICEIDA is building the capacity of INIP, which now operates in seven parts of the country, issuing licenses for fishing vessels, fish landings and processing facilities, and aquaculture processing plants; issuing export and import certificates; and operating five laboratories. Employees have benefited from educational opportunities and operational training.

In 2009, the French Development Agency (AFD) signed a financing agreement under which the French government will grant 1.5 million Euros (US\$2.1 million) to support the development of aquaculture to cultivate shrimp. The project aims to guarantee the sustainability and international competitiveness of the country's farmed shrimp subsector and will involve major stakeholders such as INIP, the National Aquaculture Development Institute (INAQUA), and the Mozambique Prawn Producers Association (APCM).

### **Industry Organizations or Sector Associations**

Mozambique has a fairly well developed sector organizations and associations representing the interests of industrial fisheries, aquaculture, and artisanal fisheries. These groups participate in the state system of resource management and are enabled by legislation to co-manage resources at the central and provincial levels.

A study should be carried out to determine if an industry cluster is needed and the feasibility of establishing one. Because Mozambique's industry consists of distinct supply chains (commercial fisheries for exports, artisanal fisheries for the domestic market), establishing an industry-wide cluster may not be practical. Instead, a cluster might consist of individuals involved in exporting fish and fisheries products who are able to discuss policy, and/or members of existing subsector organizations. Clusters could include representatives of support industries (ice factories, processing plants). The cluster could discuss ways to improve parts of the supply chain (e.g., professionalize the export business, develop and install a fisheries database, and upgrade the fleet to improve fish quality). If cluster formation is desirable and feasible, technical assistance should be provided to help establish and sustain a cluster.

### **Links Between Artisanal, Semi-industrial, and Industrial Fishing**

Intrasector coordination is necessary to ensure effective implementation of the closed season and other resource management measures (e.g., sizes of the mesh permitted in fishing nets). The Commission for Fisheries Administration (CAP) and provincial and local co-management committees provide forums for discussing such measures. Prioritizing infrastructure improvement needs, for example, could help make public or private investment in road rehabilitation, ice production, or chill storage feasible. The informal economic ties between commercial and artisanal fisheries would be difficult to use in any formal cross-sector negotiations. (These informal ties arise from the presumably unauthorized sale of by-catch by the crews of the commercial vessels. These sales erode the income of commercial boat owners and boost the income of artisanal fishermen.)

## **ECONOMIC ENVIRONMENT**

### **Global**

World imports of fishery commodities increased in value by 75 percent from 1997 (US\$56,687 million) to 2007 (US\$99,423 million).<sup>1</sup> In 2007, Japan, the United States, and Europe accounted for 56 percent of the value of world imports. Japanese imports of fish and fisheries products declined in value from a peak of US\$18,445 millions in 1995 to US\$12,396

---

<sup>1</sup> A detailed description of the trade is provided in Appendix A.



millions in 2003. Should the Japanese economy recover, demand for imported fisheries products may not revert to earlier levels because competing products are eroding seafood's share of the Japanese food market. In contrast, the value of US imports of edible fish products increased by two and a half times between 1989 (US\$5,498 millions) and 2007 (US\$13,696 millions) despite a 21 percent increase in the volume of landings of commercial fishing vessels. In the 1997-2007 period, the value of fishery products imported by the six leading importing countries of the EU increased by 32 percent while the catches of the fishing vessels of eight leading countries declined by 31 percent (1989-2006).

The world's three major markets are importing more fish, whether compensating for declines in domestic production (Japan, EU) or despite an increase in domestic catches (United States). It seems unlikely that domestic production in these markets, except possibly from aquaculture, will grow—and may even decline. Growth in population and in purchasing power will raise demand that will have to be met by imports. Exporters, however, must meet increasingly strict regulations intended to ensure that fishery products are safe, wholesome, and honestly presented. Traditional fish inspection and quality control methods, based on analysis of finished products, are being replaced by HACCP systems, and exporters must implement such systems if they wish to export to the EU, Canada, and the United States.

## Domestic

### **Supply**

In the 2004-2008 period, the supply of fish to the domestic market increased by 63 percent, domestic production grew 34 percent, and the trade balance (exports less imports) went from 1,132 tons positive to 9,476 tons negative.

**Domestic Production.** Domestic production went from 91,191 tons in 2004 to 122,561 tons in 2008. In 2008, 15 percent came from commercial fisheries, 84.3 percent, from artisanal fisheries, and 0.6 percent from aquaculture. In the 2004-2008 period, production by annual commercial fisheries declined 39 percent, while production from artisanal fisheries rose 71 percent. Production from aquaculture varied, increasing from 603 tons in 2004 to 1,068 tons in 2005, then declining to 760 tons in 2008. The overall increase in domestic production is due mainly to increases in catches by artisanal fisheries. This trend is important when considering resource management and the role of domestic and export markets in each fishery subsector. See Figure 3-1.

**Imports.** In 2007 Mozambique accounted for 0.05 percent of the value of world imports of fish and fisheries products. Imports of fishery products are a significant element in its domestic supply chain, however. In 2008 Mozambique imported US\$36.1 million in fish and fisheries products. Frozen horse mackerel accounted for 97 percent of the value of seafood imported. Mozambique's main suppliers of fish and fisheries products are Namibia and South Africa (Figure 3-2). In 2008 Mozambique imported fisheries products from these two countries to a value of US\$ 24.6 million, equivalent to 68 percent of the value of Mozambican imports. In the period 2004-2008, imports increased 50 percent in volume and 45 percent in value, indicating that unit prices have not increased.

Figure 3-1  
*Net Weight and Trade Value of Imports, 2004-2008*

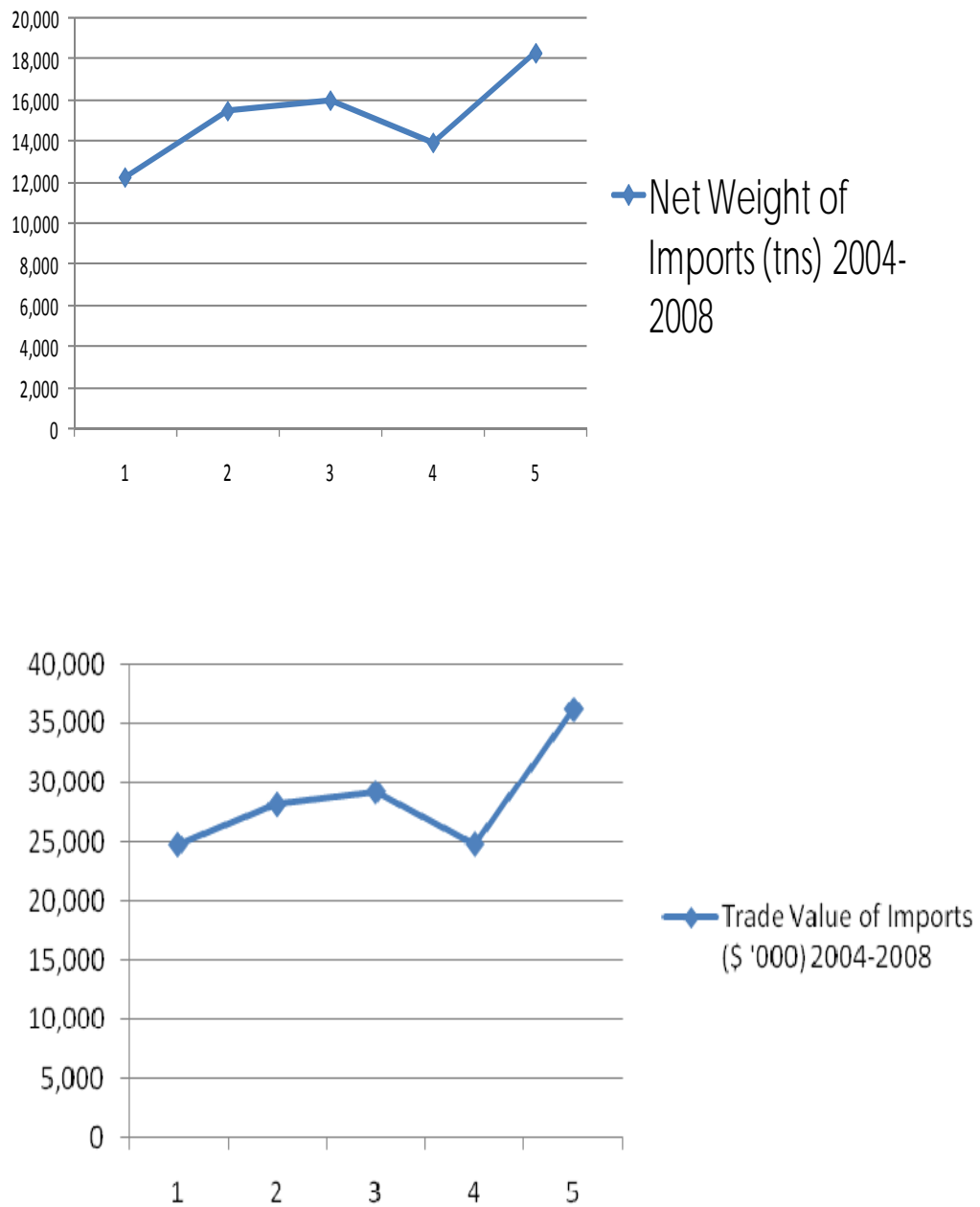
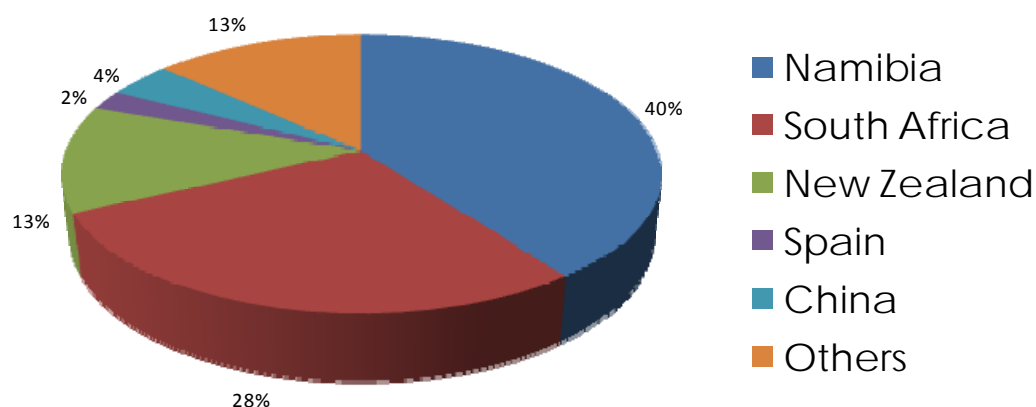


Figure 3-2  
Sources of Fish and Fishery Imports, 2008



### **Demand**

**Consumption and Prices.** Fish and fisheries products in Mozambique are bought and sold exclusively by the private sector, operating in a free market, so that prices reflect supply and demand. The domestic market chain is dominated by artisanal fisheries, which serve two distinct market segments: urban and rural.<sup>2</sup> Fish consumption increased from 4.5 kg per capita in 2004 to 6.1 kg per capita in 2008, and supply has kept pace with and even outpaced population growth. If consumption is to be maintained at 6.1 kg per capita, then the population by 2020 (26.5 million-projected) will require 162,000 tons or 23 percent more fish.

Monthly retail prices of almost all important species increased over the period 2007-2009. Mozambican consumers prefer native species in fresh form. Foreign imports are usually different species in frozen form and are much cheaper than Mozambican catch. Barring an unexpected surge in offshore and oceanic catches or in aquaculture production, more fish will have to be imported to keep prices within reach of low-income consumers. More imports will likely depress fish prices as a whole and the incomes of fishermen and fish farmers.

**Quality.** Given the likely rise in demand, prospects for improving fish quality are dim. Buyers will find it difficult to persuade suppliers to improve or even maintain quality when demand is high for fish of similar or lesser quality. A strong market, however, should impel reductions in postharvest losses as suppliers see the economic benefit of superior handling.

**Marketing Arrangements.** Artisanal fisheries and semi-industrial catches are the main supply sources for the domestic market. Fish in this market chain may change hands several times between fishermen and consumers. Owners of fishing vessels sell fish at landing sites to private buyers, chiefly trade intermediaries, who provide boxes and ice for transport to the markets. At the markets, the fish is sold to consumers or to wholesalers for distribution. Most fish is marketed and consumed in fresh form. Some fish are frozen for the local market.

<sup>2</sup> Mark-ups at each link in the chain should be examined as part of a larger value/market chain study of the fishery sector.

Trade intermediaries often perform other useful functions and services not otherwise available (e.g., financing producers, providing credit to customers, ensuring a ready market, transportation). When fishermen can manage without such intermediaries, however, they get a larger share of final prices. The margins of the trade intermediaries vary greatly between the rural and urban domestic markets. Lower consumer purchasing power in the rural areas means mark-ups are much less than in urban areas. Nevertheless, competition at all levels in the marketing chain tends to ensure that margins are reasonable to the benefit of boat owners and fishermen, as well as consumers.

**Exports.** Exports from Mozambique declined by 34 percent in quantity and 41 percent in value in the period 2004-2008. In 2007, Mozambique accounted for less than 0.06 percent of world exports of fish and fishery products. The decline in value in relation to volume reflects the fall of unit prices of shrimp on the international markets.

Shallow water shrimp and deep water shrimp are the principal export and, between them, accounted for 81 percent of the value of Mozambican seafood exports in 2008. Most shrimp are destined for Europe and South Africa. Shrimp prices vary by species or raw colour, size, product forms, and the reputation of supplying countries.<sup>3</sup> By value, the main destination is Spain. Spanish buyers absorbed 45 percent of the value of Mozambique's fish and fisheries products in 2007 and 48 percent in 2008. See Figure 3-3.

**Regulation of Exports.** Growth in population and in purchasing power will raise demand that will have to be met by imports. Exporters, however, must meet increasingly strict regulations intended to ensure that fishery products are safe, wholesome, and honestly presented. Traditional fish inspection and quality control methods, based on analysis of finished products, are being replaced by HACCP systems, and exporters must implement such systems if they wish to export to the EU, Canada, and the United States. (See Appendix A.)

## LEGAL ENVIRONMENT

### General Agreement on Tariffs and Trade

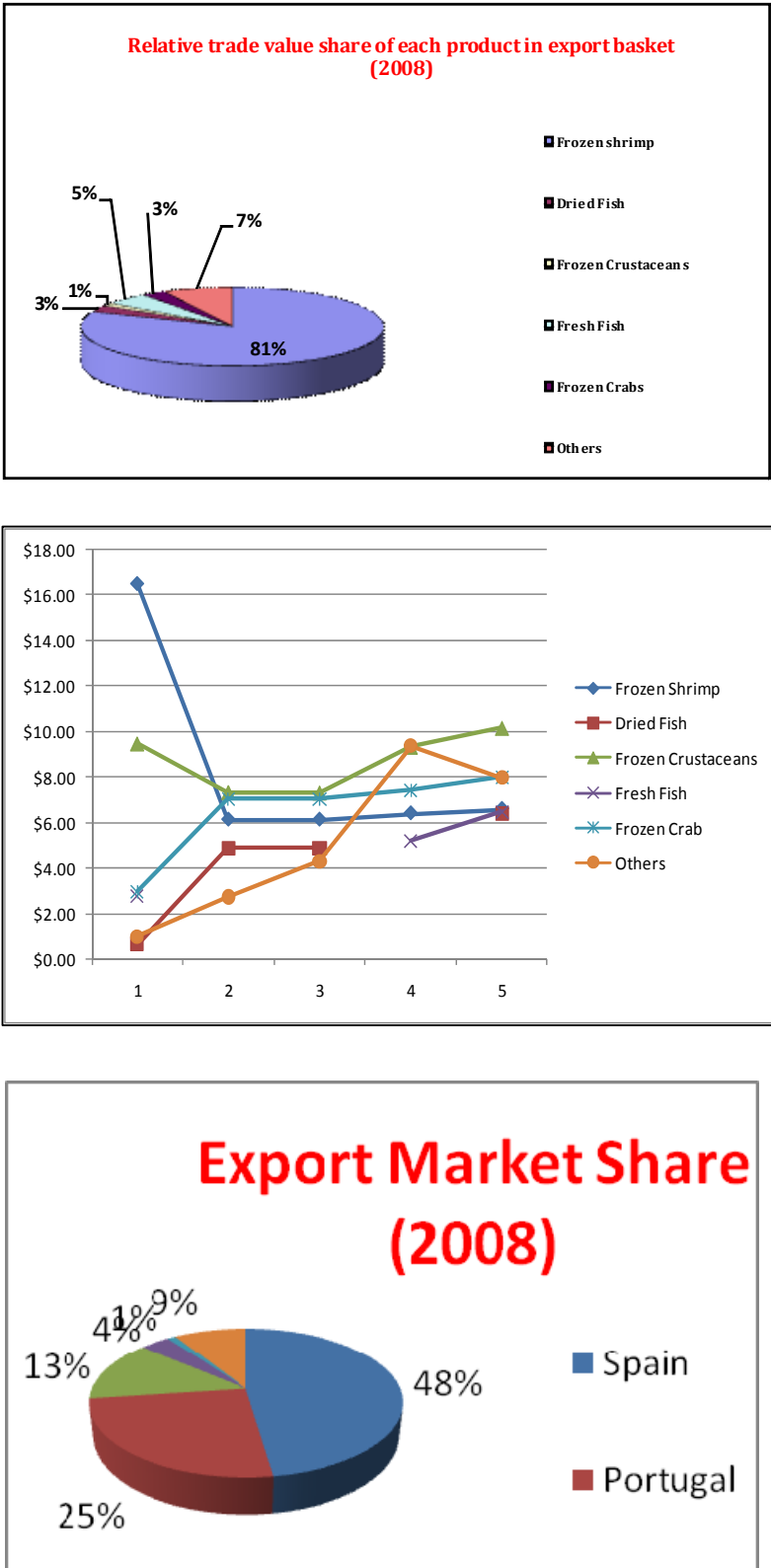
Trade concessions negotiated during the Uruguay Round are annexed to the Marrakesh Protocol to the General Agreement on Tariffs and Trade (GATT). These provide for greater market access by reducing trade barriers and providing legal security for market access through tariff bindings. The schedules of commitments provide security for market access but also limit other forms of protection. Multilateral trade agreements, by which all members of the World Trade Organization (WTO) are bound, strengthen and expand the rules, procedures, and institutions that govern measures which could be used to protect market access and thus offset increased market access agreed. Agreements relevant to trade in fisheries products include:

- Sanitary and phytosanitary measures (SPS)
- Technical barriers to trade (TBT)

---

<sup>3</sup> A description of the international market for shrimp is presented in Appendix C, and the evolution of the US market prices is presented in Appendix D.

Figure 3-3  
Principal Fish Exports and Destination Markets , 2008



- Antidumping measures
- Import licensing procedures
- Subsidies and countervailing measures (SCM) and safeguards.

Tariff reductions were to be implemented in equal rate reductions, the first effective on January 1, 1995, with successive reductions effective on January 1 of each succeeding year and the final rate effective no later than four years after the date of entry into force of the agreement establishing the WTO. Reductions might, however, be implemented more quickly.

The GATT has some positive implications for Mozambique's fisheries. With better market access Mozambique should be able to increase export volume and value, create jobs and raise incomes—increasing economic activity overall. Stable and transparent trading rules will aid planning and implementation of investment and trading activities. The principle of nondiscrimination means that countries with less economic or political power receive equal treatment by and access to the markets of other member countries. Should there be import surges after quantitative restrictions are lifted, members have recourse to a safeguard provision that allows them to increase tariff rates. Improved SPS and TBT rules should provide transparency and restrain the use of arbitrary and unjustified production standards as trade barriers. Developing countries have an extended period to phase out any subsidies favoring their exports or their domestic over imported goods.

But not all implications are positive. While elimination or reduction of tariffs on fishery products may be good for fish processing, increases in the production of the raw material required to meet increased demand may lead to overfishing. Improved access to the Mozambican market for fish (and other competing foods) will tend to decrease domestic prices and producers' incomes, but this will be beneficial to consumers generally.

## **National Legal Environment**

The legal framework in Mozambique is developing in line with international legal standards for the industry as well as national demands. The licensing system and applicable charges are set out clearly in the legislation. Fisheries legislation in Mozambique consists of several instruments, the main documents of which are as follows:

1. The Fisheries Law, approved as Decree 3/90 of 26 September 1990, establishes the general framework of fishing activities
2. The General Regulation of the Fisheries Law, approved as Decree 37/90 of 27 December 1990, filled some gaps in licensing and enforcement.
3. The General Marine Fisheries Regulation, adopted by Decree 16/96 of 28 May 1996, defined the typologies of fisheries by species, vessel size, and other specifications related to fisheries activities.
4. Decree 43/2003 of 10 December 2003 revised the Regulation to introduce modern management concepts and establish the use of co-management in fisheries management, the mandatory use of devices to protect endangered species (e.g., TED) and to reduce by-catch, and, for the first time, the possibility of creating artificial devices.

5. The General Regulation for Aquaculture was approved and adopted through Decree 35/2001 of 13 November 2001, which set up the framework for aquaculture activity in Mozambique.
6. The establishment of quality standards is a priority area for the government. Taking into account the importance of the fisheries sector for the national economy and the need to ensure that Mozambican products hew to high standards, a regulation on Fish Inspection and Quality Control was approved and adopted by Decree 17/2001 of 12 June 2001.

Mozambique's legal environment allows for the sustainable development of the fisheries sector but the issue of licensing merits attention given the sector's economic difficulties. The rule of thumb for access fees is to charge 5 percent to 10 percent of turnover.<sup>4</sup> Some fees also cover other activities, such as research. Therefore, the normal basis for negotiation is charge of 5 percent to 10 percent of the catch value. A comparison of the value of the tonne of product versus the cost of licensing shows that licence fees in Mozambique are in this range. This may not always be the case, however, as the fee is fixed and does not vary according to catch or turnover. Allowing fees to vary with catch volume would ease pressure on an industry experiencing a decline in turnover.

The government's implementation of the sophisticated system of monitoring, control and surveillance (MCS) of fishing activities in territorial waters has some shortcomings but is backed by a regional agreement of cooperation, which further safeguards against infractions and compensates for inadequate capacity for monitoring offshore activities. Port inspections, including that of data captured in the Fishing Vessel Diary, are carried out consistently, providing the framework necessary for issuing certificates of catch legality of the catch as required by the EU starting January 2010.

In sum, Mozambique's legal environment for commercial fishing meets preconditions for successful investment and licensing. From the point of view of the private sector, the clear system of regulations and payments provides a level playing field and the transparency needed for investment.

## TECHNOLOGICAL FACTORS

### Product Handling

**At Sea and Unloading.** The writer had no opportunity to observe at-sea operations or handling. However, the lack of rejections of Mozambican products by markets overseas suggests that the necessary quality and standards pertaining to fish handling are observed along the chain, including operations at sea.

**Ice and Chill Storage.** Government officials and private sector representatives that there is a shortage of ice. Most ice producers we interviewed sell only to boats with which they have an agreement for the delivery of catches, and they sell at high prices (MT 2.5-5,0/kg, or US\$ 93-185/tonne versus the world price norm of US\$15-25/tonne). Representatives of the National

---

<sup>4</sup> The most notable cases of cost recovery are Namibia, where access fees are based on a levy of tonnage; Falklands, which charge 10 percent of estimated turnover; and Madagascar, which charges 8 percent of turnover.

Institute for the Development of Small Scale Fisheries (IDPPE) point out that the lack of electricity in many areas constrains ice production and believe that the use of ice is not profitable for artisanal fisheries. Assistance for the financing the purchase of new ice plants or the expansion of existing plants should be considered.

Chill storage facilities are available at only some landing sites or associated markets, but do not meet the needs of artisanal fisheries. The issue has not been raised in respect to commercial fisheries.

## Transportation

The distribution of perishable fish and fishery products is impeded by a scarcity of specialized vehicles and seasonal use of access roads. Artisanal fishermen ride bicycles or walk to the nearest market, which erodes product value and limits the quantity that can be transported. Commercial fisheries, especially those in the export business, are not affected by the lack of infrastructure and transport facilities.

## Postharvest Losses

Postharvest losses in fish weight and quality are chiefly the result of inadequate handling. No precise estimates of such losses among Mozambican fisheries are available but are believed to be relatively high in the artisanal fisheries. Loss levels vary with catch volume and the ability to process and conserve unsold fish. A study is required to define losses by quantity and by value, and to propose actions to reduce or eliminate losses in artisanal and semi-industrial fisheries. There was no mention of post-harvest losses in the commercial fisheries sector.

## Processing

Fish is processed for sale in fresh, frozen, and dried forms. Mozambique's canneries have reportedly closed. There is a qualitative difference in the processing for domestic and for export markets. While the processing for export is highly regulated, the processing for domestic consumption appears to be less tightly controlled.

**Domestic Market.** Fish that are not good enough for local sale or for export are processed into dried fish. The number or capacity of domestic fish drying facilities is not known. Some facilities are curing yards where fish is salted; others consist of little more than fish drying in the sun on open ground. The products of the domestic processors are acceptable to local consumers, chiefly in rural areas, and there are no reported problems with safety or quality. Domestic processing is regulated under the same legal instruments as export processing.

**For Export.** The quality and safety of processed fishery exports appear to be adequately regulated. The Regulation of Inspection and Guarantee of the Quality of Fisheries Products is contained in Decree number 10/98 of March 17. Decree 17/2001 of June 12 establishes hygiene, health, and management requirements for handling, processing, and export and import of fisheries products, with a view to protecting consumers and guaranteeing compliance with market requirements.

The EU has designated the INIP the Competent Authority. INIP inspects all stages in the flow of product (boats, landing sites, processing plants). Plants are inspected periodically and with greater frequency if problems are detected. Plants not in compliance have a period to achieve



compliance. If they fail to comply, INIP may refuse them the health certificates required for export shipments and may close down plants that are seriously noncompliance.

In 2009 the INIP reported that 72 companies were authorized to export from Mozambique, of which 42 export shrimp. Of the authorized exporters, 25 are approved for export to the EU, 42 to other markets, and 5 to both the EU and other markets. Regulated land-based establishments include 32 processing plants, 3 cold storage facilities, and 2 ice factories. The INIP has inspected 156 vessels. All plants are reported to have installed HACCP food safety systems as required by law. Compliance with good manufacturing practices must be continually ensured.

## ENVIRONMENTAL FACTORS

The state of resources is the fundamental factor in the development of the fishery sector (see Exhibit 3-1). Fishery resources in Mozambique are now limited, which makes sound management even more important. The most commercially valuable national fishery of shallow water shrimp is considered fully exploited, while deepwater shrimp and other species offer potential for increased catches.

### Turtle Excluder Devices

A turtle excluder device (TED) is a grid of bars with an opening at the top or the bottom. The grid is fitted into the neck of a shrimp trawl. Small animals, like shrimp, slip through the bars and are caught in the bag at the end of the trawl. Large animals, such as turtles and sharks, that are caught at the mouth of the trawl strike the grid bars and are ejected through the opening. The NMFS claims that TEDs are effective in excluding up to 97 percent of sea turtles with minimal loss of shrimp.

The U.S. government requires shrimp fishing vessels of other countries to use TEDs if those countries wish to export shrimp to the United States. Some believe this constitutes an inappropriate restraint of trade and have raised a dispute at the WTO. The Government of Mozambique has adopted legislation (Article 110 of the General Regulation Governing Maritime Fishing) introducing TEDs into commercial fishing activities but no implementing regulations are yet in place. Political interest in settling the issue is clear, but pressure or public and industry interest in implementing the legislation is lacking. This may be because Mozambique's current import markets do not require TEDs. The EU, for example, recommends TEDs without making them a condition of market access.

A team from the U.S. Department of State and the U.S. National Oceanographic and Atmospheric Administration (NOAA) visited Maputo and Beira in September 2009 (20- 24) to assess Mozambique's TED program and to provide equipment and training to stakeholders. The team was pleased to find that the program was more robust than expected even though Mozambique was not yet ready for Section 609 certification. Government representatives proposed that the team return as early as summer 2010 to evaluate the program. To ensure that Mozambique's TED law is enforced throughout the sector, the ministry was beginning pre-season (November-March) licensing inspections that would dramatically improve compliance and prepare Mozambique for early certification. The team praised the government's initiative while noting that the lack of implementing regulations and an under-

resourced inspector corps made certification in 2010 more realistic. Details on the position of the U.S government on TEDs is presented in Appendix E.

## **Fish Stock Evaluation and Monitoring**

The IIP conducts fish stock evaluation and monitoring and recommends resource management measures, including quotas, to the Ministry of Fisheries. The Ministry is very concerned about the exploitation of the shallow water shrimp and has devised a management plan for those shrimp and for line fishing. The National Directorate for Fisheries Administration (DNAP) foresees a need to restructure the industrial and semi-industrial fleets and to identify funds for devising and implementing an operation plan. One shortcoming of the stock evaluation and monitoring system is a lack of information on the tuna fishery. One strength is that an extended network of fieldworkers helped improve monitoring of artisanal catches and subsequent control of stocks closer to shore.

## **FISHING ACTIVITY MANAGEMENT**

Full analysis of the management of fishing units should be undertaken separately and should concentrate on applied business practices, such as production and other processes, and the cost structures applied to production. We can, however, draw some general conclusions from limited information on operations provided to us by a small number of commercial fishing companies.

### **Operational Efficiency**

Operational efficiency is estimated on the basis of the ratio of vessel days at sea and maximum days at sea permitted. Data on ratios is difficult to obtain in a systematic form across the sector but statistical data on catch per unit of effort (CPUE) and catch composition are indicative of the parameters within which the industry operates. CPUE varies greatly during the season, with values at the beginning more than double the average for the entire season. The larger, more valuable shrimp are most abundant in the early part of the season. Therefore, securing positive returns depends very much on having vessels ready to enter the season at its very start.

The highest costs are for fuel and labour. Businesses that minimize fuel consumption and labor costs are more cost effective. The ability to minimize these costs is related directly to boat holding capacity and the need to offload, as well as the type and fuel consumption consumption of the boat engines. At the beginning of the season, some operators have catches as high as 1,000-1,900 kg per boat per day; catch rates decline as the season continues. The breakeven point for these operations is reported to be around 500 kg per boat per day; below this point the cost of the fishing effort is higher than the value of the catch.

Given constraints in resources and costs, operations must be managed to increase daily catch capacity, maximize days spent fishing, and minimize time spent offloading, resupplying, and fuelling. One major Mozambican company is adapting by having a mother ship bring fuel, groceries, and other supplies, including substitute crews, to fishing vessels. This maximizes the vessel fishing time because vessels do not leave the fishing grounds to go to port and back, which may take as much 2-3 days each way.

The IIP has recommended a reduction of effort for shrimp to 180,000-200,000 trawling hours per year. This would intensify the need to derive maximum yields in shorter and shorter periods of time and force companies to operate at maximum efficiency and optimize processes for boat maintenance, services, unloading, etc. A shorter shrimping season would also intensify the need for vessels to diversify the fisheries they use so they can increase their active fishing days and not depend on one fishery. Larger companies are already diversifying their fisheries.

Other countries that have faced similar pressures in national fishery management have expanded their overseas fishing. For example, Sri Lankan and Indonesian boat owners and fishermen have developed a long distance fishery in the Indian Ocean, where Chinese and Taiwanese fishing vessels also operate. In this fishery, in which multiday boats make trips of up to 30 days or more, fish is caught throughout the Indian Ocean from Africa to Indonesia. In Sri Lanka these vessels, mostly 28-32 feet long and privately owned, are licensed to fish only outside Sri Lankan waters. The catches are sent unfrozen by air freight to major markets, such as Japan and the EU. Given the location of Mozambique in relation to this fishery and the need to diversify activities, commercial fleet operators should consider competing in this fishery.

## **Fuel Costs and Fuel Subsidies**

The rising cost of crude oil has driven up operating costs for fishing vessels the world over. Fisheries with smaller profit margins, and which cannot regain profitability by influencing revenues or quickly cutting costs, have simply decreased their effort. In fact, all industries in which fuel is a major cost have been affected and some, like the aviation industry, have restructured or upgraded their fleets to reduce fuel consumption.

Rising fuel prices have compounded difficulties in the EU's fisheries sector rooted in the mismatch between fleet size and sustainable levels of resources. In most European harbours, marine fuel prices have increased 240 percent since 2004. Operators there normally pay less for their fuel (chiefly diesel) than road users but the price is still at least as high as the pre-tax price of fuel. A few EU states have offered fishing vessel operators grants to defray high fuel costs. Because the EU strictly controls the number of vessels the economic impact of fuel subsidies is muted. Absent such controls, subsidies would encourage more vessels to fish for longer periods, which, in turn, would lower revenue and industry profits. In the EU, however, subsidies lead to a shorter fishing season and less efficient use of capital, as boats compete for the same fish under the Total Allowable Catches defined for the entire fleet. (This situation bears a strong resemblance to the state of the shallow water shrimp fishery in Mozambique.)

Fishermen in several EU states are pressing for even more public aid to cope with fuel costs, and this has stirred controversy. In response, the European Commission has agreed in principle on emergency measures for cutting costs, benefitting fleets that restructure, and increasing the value of catches. The Government of Mozambique could consider similar measures to overcome difficulties in the country's fishing sector.

Measures to improve the economic sustainability of industrial fisheries should include aid for modernization schemes that encourage companies to use more efficient vessels and fishing gear. Once the industry shifts to low fuel-consumption practices and efficient motors and to fishing gear with low environmental impact, however, there is likely to be an increase in

fishing effort and exploitation of already over-fished stocks. The consensus in Europe is that fuel subsidies have increased fishing pressure and depletion of fish stocks, and that, ultimately, they support economically unprofitable practices. But getting fuel at international prices in Mozambique would not be a measure to put the industry on an equal footing with international competitors.

### **Ice Costs**

In Mozambique, other operational costs need to be addressed, such as the high cost of ice. The scant supply of ice means it is a sellers' market in which ice producers dictate prices and secure high margins. In rural and isolated areas where ice is made in small quantities with the aid of diesel-powered generators, costs are even higher and affect the artisanal fisheries sector. In larger population centers with reliable electricity supply the price can be reduced by promoting production and by introducing new investors.

### **Port Access Costs**

Poor conditions, such as silting and lack of service, in the fish port in Beira causes fishing vessels to use the much more expensive commercial port. Wharfage at the fish port costs MT 500/day during the season and MT 50/day during the closed season (which owners are not paying) for vessels under 300 GRT. Wharfage at the commercial jetty costs MT 2,500/day. In addition, fishing ports are available only along the south and central parts of the coast; travel times to reach these ports also drives up operational costs.

## **OPPORTUNITIES FOR VALUE ADDING INVESTMENTS AND INTERVENTIONS**

### **Boost Competitiveness in Global Markets**

Appropriate subsector cluster(s) can improve the export performance of Mozambique's fisheries by making industry activity fully professional and by ensuring that participants have or acquire skills and resources. To be successful, exporters must have sound financial resources and industrial and export management skills and capacity.

### **Stimulate and Improve Exports**

Exporters need to be financially and technically strong. They must have

- Capital to build and equip a processing plant to international standards;
- Financial strength sufficient to be able to accept a return of product if it is rejected in the destination market and to refund money to the buyer;
- Working capital to finance the product, from paying cash to the suppliers of raw material at the plant, to the moment of collecting the value of the sale, often against a letter of credit, some time after shipment of the finished product; and
- Industrial management experience, including knowledge of quality assurance, international marketing, and international payment arrangements.

In general, small producers lack the resources, experience, and ability to guarantee their products. They cannot meet product specifications or quality standards, or make timely shipments. Export failures erode the reputation of all a country's fisheries exports, even

though problems might have arisen among only a few exporters. Moreover, importers can take unfair advantage of such lack of knowledge and experience by making unjustified claims about quality and by delaying or refusing to make payment for the products shipped.

Some countries have tried to encourage small producers to form cooperatives or other joint endeavors to build and operate processing plants. But even together producers often do not have enough equity capital, are unable to find sources of working capital, are not efficient managers, or tend to sell raw material to other processors when offered slightly more than the cooperative or joint endeavor can pay. Independent producers, large or small, should be encouraged to sell to two or more processors to stoke competition and thereby keep buying prices as high as possible.

### **Invest Properly**

Indiscriminate investment in processing facilities should not be encouraged. Overinvestment in capacity (where capacity is greater than is needed to process the raw material available) causes processors to try to meet their needs for throughput by bidding up raw material prices to levels beyond the profitable. In such situations, processors find it difficult to insist that suppliers deliver material that meets international standards for finished products. Moreover, unnecessary investment eats up scarce capital and has severe secondary effects: when plants close for lack of raw material, workers are laid off and processors fail to pay suppliers and lenders.

Processing capacity must be balanced with supplies of raw material. Producers need to be able to sell their fish to more than one processor; and processing capacity should be such that processors can be fairly sure of obtaining the quantity and quality of raw material needed to be competitive in international markets and to remain financially viable

.



# 5. Recommendations

## **OPTIMIZE PROCESSING SUBSECTOR**

To stimulate and sustain the processing subsector for fish and fisheries exports, clusters should consider the following:

- Prohibit the leasing or renting of processing facilities so that facilities capable of consistent production of export-quality products are operated by owners.
- Regulate access to the processing industry so that capacity does not exceed raw material supplies. A relevant authority could auction transferable rights to process by capacity.
- Monitor the competitive position of exporters frequently enough to ensure that comparisons remain valid. This might entail monitoring the cost of inputs (raw material, electricity, fuel, import duties, ice, packaging material) and other factors (freight availability and cost, relative exchange rates) in Mozambique and in competing countries (Thailand, Indonesia, China, Taiwan), so that remedial actions, where possible and appropriate, may be taken.
- Require exporters to pass an approved course in export management.
- Provide exporters and government officials training and assistance to ensure smooth implementation and maintenance of regulatory systems required by export markets.
- Facilitate pre-export inspection of fishery products by authorizing a single agency to conduct inspections and to issue export clearances.
- Facilitate preparation of export documents, preferably by means of a one-stop shop where all approvals can be obtained simultaneously, in Maputo and at regional centers of export production.
- Make available current market and price information, including details of changes in the regulations in import markets.
- Encourage exporters' attendance at international seafood trade exhibitions, fairs, and conventions.
- Encourage close relationships between Mozambican exporters and individual importers in destination markets in order to develop value-added or further processed fishery products that improve margins for everyone in the marketing chain.

## **ESTABLISH EXPORT MARKET DATABASE**

Successful exporting of fish and fisheries products depends in part on information about markets. Exporters obtain information through individual connections, including longtime buyers, but institutions have no access to information that buyers share only with suppliers.

Information from Customs is useful only with regard to quantities, because any values can be declared. Exporters would also like information on transactions, but know that no government body can yet obtain this. Furthermore, products vary according to packers' specifications and customers' requirements (e.g., colors of Black Tiger shrimp, specified number of pieces/lb, uniformity). Some good information can be had in India, where exporters state valid prices on invoices sent to Customs to take advantage of an export value incentive.

An export-oriented fisheries cluster should consider the usefulness of a database. The database can be used to help overseas importers and investors contact Mozambican exporters or to help Mozambican exporters find importers, or to do both. The excellent database of India's Marine Products Export Development Authority (MPEDA) ([www.mpeda.com](http://www.mpeda.com)) is of this type. MPEDA's database provides contact information on Indian exporters, some export statistics, indicative prices of fisheries products from several markets, and other information about Indian fisheries.

Exporters and producers would benefit from a database. Although major exporters do not need nor use such sources, they could still benefit when approached by new overseas importers.

Should it be decided to proceed with a database, the following actions are recommended:

- Follow the concept of the MPEDA database, with adjustments.
- Enter into the database
  - Contact data for Mozambican exporters (company name, address, contact person, telephone, e-mail) and information on their products.
  - Details of species and products available for export from Mozambique.
  - Dates and locations of national and international trade fairs.
  - Mozambican export statistics.
- Later expand the database to include details of market countries (imports by country of origin and by quantity and value, indicative prices, regulatory and other market information).
- Sell advertising space to Mozambican exporters.
- Make overseas importers aware of the database by advertising in trade journals in target market countries, attending trade shows, and informing Mozambican embassies and trade offices about it.
- Make use of sources of existing expertise, such as the FISH INFO NETWORK of the Regional Marketing Information and Advisory Services, to develop and maintain the database. Mozambique is in the area covered by INFOSA, which is based in Windhoek, Namibia, [www.infosa.org.na](http://www.infosa.org.na).

## **IMPROVE INCOMES AND VALUE ADDITION: INCREASE PRODUCERS' INCOMES**

A rise in the incomes of primary producers (fishermen, fish farmers), except with respect to products exported, tends to cause a corresponding rise in market prices and in prices to consumers. Therefore, the desire to raise incomes must be weighed against the need to ensure a supply of affordable fish on the domestic market. Encouraging, or merely permitting, the



import of (relatively) cheap fish will increase supply in the local market and hold down or depress market prices for all fish. This will benefit consumers, but not producers.

Markets tend to be efficient and self-regulating. When excessive margins or profits attract new actors to a market segment, the resulting competition brings down margins and profits. It is unlikely that Mozambique is an exception to this rule. Consequently, competition at all levels in the marketing chain should be encouraged, even though margins and profits reported do not seem excessive in international terms.

The main weakness of fishermen, fish farmers, and minor actors in any fisheries marketing chain is lack of capital to purchase assets, make repairs, or finance operations. Formal lenders are often unwilling to finance them because they have no equity, credit record, or acceptable collateral or because their cash flow is uncertain. Informal lenders may charge very high interest rates and require very rapid repayment, so that the best option may be to borrow from one of the strong links in the marketing chain, usually wholesalers.

In return for providing financing and other services, such intermediaries usually require that producers sell through them exclusively, a practice that intermediaries may abuse by paying below-market prices or by insisting on other disadvantageous marketing arrangements. Requiring exclusivity gives intermediaries a better chance of recovering loans so, in commercial terms, is not unreasonable. After all, not all loans of this type are fully recovered by lenders, whose margins or commissions must include provision for bad debts.

Producers would be able to obtain better prices and marketing arrangements if they could create competition for by selling to or through two or more outlets.

Providing debt financing to producers who have no equity capital will encourage them to be in business on an unsound footing. A rule of thumb for any business is that debt should not be more than two times equity and, in high risk businesses such as fishing or fish farming, lenders may require borrowers to put up an even higher proportion of equity capital.

While owners of fishing vessels tend to maintain them better than fishermen merely working on them, it is unwise to encourage fishermen lacking sufficient capital to become owners. Doing so puts them in a position of weakness likely to drive them into exclusive marketing arrangements with intermediaries. In addition, a fisherman will not necessarily have a greater net income as an owner than as a laborer.

These observations are as valid for fish farming and marketing as they are for fishing. Lenders consider them all risky ventures, with a high failure rate. What is needed is a way for small fishermen, farmers, marketers in the supply chain to generate adequate equity. If they are unable to do so, they should be discouraged from becoming owners of assets on the basis of little or no equity and so incur too much debt.

## **INSTITUTE OR REFORM POLICIES**

In addition to supporting creation of an export database, the government should consider the doing the following to promote the competitiveness of the commercial fishing sector:

- Adapting Mozambique's fleet to enable sustainable resource use on the basis of fishery management plans.

- Elaborating resource management plans for commercial fisheries (e.g., demersal species), similar to the Shallow Water Shrimp Management Plan now being developed.
- Supporting modernization schemes that encourage fishing companies to use more efficient vessels and gear.
- Regulating the law on TEDs to allow access to the U.S. market
- Joining the Indian Ocean Tuna Commission in order to obtain stock data and improve estimates of economic opportunities in the tuna fishery.
- Continuing to support areas of common concern, such as monitoring, control, and surveillance and enforcement.
- Excluding operators and vessels engaged in illegal fishing or in activities that breach national and international environmental laws.
- Providing training in export management to improve understanding and handling of export process and documentation and to reduce risks associated with international payment arrangements.
- Establishing one-stop window to reduce time and effort spent obtaining export documents.

## **INVESTIGATE INVESTMENT OPPORTUNITIES**

Certain investments could improve and develop the country's fishing sector. These include investments in optimizing species diversification in national waters (e.g., high-value fish, mud crab, cephalopods) and supporting multiday international long-line fishing outside national waters and throughout the Indian Ocean, including south towards Antarctica—and securing air transport to markets.

Mozambique should consider entering the multiday fishery practiced by Sri Lanka and Indonesia. This would entail providing vessel owners assistance to finance the purchase of new vessels; providing fishery harbours, slipways, and other shore facilities for such vessels; and providing vessel owners information on to how to obtain legal access to the fishing grounds of other countries, and at what cost.

Other investments would improve value addition and incomes of those involved in the catch and sale of fish for the domestic market. These include improving access roads and availability of ice and chill storage to reduce losses in the artisanal value chain; and promoting ice production and entry of new investors into ice production.

## **INSTITUTE CRISIS MANAGEMENT MEASURES**

The government should investigate steps necessary to secure access to fuel at international prices, introduce individual transferable quotas (ITQs), and introduce flexible licence payments on tonnage caught. It should also review the costs of licenses. The private sector should identify the most appropriate business models for process optimization, review cost structures, and diversify markets and products.

# Appendix A. Seafood Hazard Analysis Critical Control Point Regulation

## *Of the United States Food and Drug Administration*

Procedures for the Safe and Sanitary Processing and Importing of Fish and Fishery Products (21 CFR, part 123 and part 1240)

**Requirement.** Seafood entering commerce in the United States must, with effect from 18 December 1997, be processed in compliance with the USFDA seafood HACCP regulation.

**Effect of failure to comply with the regulation.** Lack of evidence showing that imported seafood products were produced under the required controls will create the appearance of adulteration and the goods will not be allowed entry into the United States.

**Verification of compliance.** Compliance with the regulation must be verified by either (1) a recognised competent authority of a country with an active Memorandum of Understanding (MoU) with USFDA, which covers fish or fishery products and documents the equivalency or compliance of the inspection system of the foreign country with the US system; or (2) a US importer.

**HACCP plan.** The USFDA seafood HACCP regulation requires the application of HACCP principles to the processing of domestic and imported seafood.

Under this regulation every processor must conduct a hazard analysis and, if one or more significant hazards are identified, must write and implement a HACCP plan. HACCP plans must be specific to each location, each process and each type of product.

**Pre-requisite activities.** HACCP, to be successful, must be built upon foundations comprising: (1) compliance with current Good Manufacturing Practices (GMPs) (21 CFR, part 110); (2) written Sanitation Standard Operating Procedures (SSOPs) specific to each processing location; (3) trained company personnel; and (4) management commitment at the highest level.

**Those subject to the regulation.** Domestic and foreign companies, which process fishery products which enter inter-state commerce in USA, are required to comply with the regulation.

Processing is defined as handling, storing, preparing, heading, eviscerating, shucking, freezing, changing into different market forms, manufacturing, preserving, packing, labeling, dockside unloading or holding of fish or fishery products.

The regulation does not apply to harvesting or transporting fish or fishery products, without otherwise engaging in processing; to practices such as heading, eviscerating or freezing intended solely to prepare fish for holding onboard a harvesting vessel; or to retail operations.

US importers do not need HACCP plans, unless they conduct processing activities at a company owned facility.

**Current GMPs.** Part 123.5 of the regulation indicates that “Part 110 of this chapter applies in determining whether the facilities, methods, practices and controls used to process fish and fishery products are safe, and whether these products have been processed under sanitary conditions.”

Part 110, which is entitled Current Good Manufacturing Practice in Manufacturing, Packing or Holding Human Food, provides the criteria and definitions which shall apply in order to determine whether a food is adulterated in that it has been “manufactured under such conditions that it is unfit for food” or that it has been “prepared, packed or held under unsanitary conditions, whereby it may have become contaminated with filth, or whereby it may have been rendered injurious to health.”

Good Manufacturing Practices (GMPs) cover broad aspects of:

- Personnel (disease control; cleanliness; education and training; supervision)
- Buildings and facilities (plant and grounds; plant construction and design)
- Sanitary operations (maintenance; cleaning; pest control; sanitation of food contact surfaces; storage and handling of equipment and utensils)
- Sanitary facilities and controls (water supply; plumbing; sewage disposal; toilet facilities; hand-washing facilities; rubbish and offal disposal)
- Equipment and utensils
- Production and process controls (raw materials and other ingredients; manufacturing operations)
- Warehousing and distribution
- Defect action levels

**Sanitation control procedures.** The sanitation standard operating procedures (SSOPs) should specify how processors will meet the sanitation conditions and practices which are required to be monitored.

Compliance is assured by means of mandatory monitoring of, and record keeping in respect of, eight key areas:

- Safety of water
- Condition and cleanliness of food contact surfaces
- Prevention of cross-contamination
- Maintenance of hand-washing, hand-sanitation and toilet facilities

- Protection from adulteration by contaminants
- Labeling, storage and use of toxic compounds
- Control of employee health conditions
- Exclusion of pests

SSOPs are required, whether or not a HACCP plan is called for.

***US importers.*** US importers must specify the safety standards, which the products of the overseas exporters must meet.

In the absence of a MoU between USFDA and the exporting country, US importers must affirm that the products exported to USA were processed under a HACCP-based system. Without verification of compliance by US importers seafood products cannot, unless they are from a country with a MoU with USFDA, enter commerce in USA.

***Overseas exporters.*** To export seafood products to USA, in compliance with the USFDA seafood HACCP regulation, overseas exporters should: (1) be in compliance with GMPs; (2) arrange for training of personnel in HACCP principles; (3) conduct a hazard analysis and write HACCP plans if one or more significant hazards (significant hazards are those reasonably likely to occur) are identified; (4) implement the HACCP plans; and (5) prepare and implement SSOPs.

International Marine Fisheries Company

July 1997



# Appendix B. World Fisheries Trade

## **FOREIGN MARKETS**

It seems unlikely that domestic production in the three major markets (Japan, USA and the EU), except possibly from aquaculture, will show any substantial growth and may decline. Growth in population and in consumer purchasing power in these markets can be expected to generate increased demand for fishery products, which will have to be met principally by increases in imports. Although the anticipated strong demand for imported fishery products should be favorable for exporting countries, such as Mozambique, exporters are being required to comply with increasingly strict regulations, as the market countries try to ensure that fishery products are safe, wholesome and honestly presented.

## **IMPLICATIONS OF GENERAL AGREEMENT ON TARIFFS AND TRADE**

Not all of the implications of the General Agreement on Tariffs and Trade (GATT) are positive for the Mozambican fishery sector. Improved access to international markets should cause increased economic activity, as growth in exports results in more employment and higher incomes. Stable and transparent rules for international trade should lead to improved planning and implementation of investment and trading opportunities. Care must be taken, however, to ensure that increases in the demand for fish for export do not lead to overexploitation of resources. Improved access to the markets in producing countries for fish (and other competing foods) from overseas will tend to result in a decrease in price levels in the domestic market, which will reduce producers' incomes, but this will be beneficial to consumers generally.

## **FOREIGN TRADE**

### **World Imports**

World imports of fishery commodities increased in value by 75 percent from US\$56,687 million in 1997 to US\$99,423 million in 2007. In 2007, the three leading Asian importing countries (Japan, China, South Korea), the USA and the six leading importing countries of the European Union (France, Spain, Italy, Germany, the United Kingdom, Denmark), between them, accounted for 68 percent of the value of world imports.

## Japan

The catches of Japanese fishing vessels and Japanese production from aquaculture have declined from 11.9 million tons in 1989 to 6.0 million tons in 1999 and to 5.2 million tons in 2007. The major decline in Japanese catches has been in respect of sardines, which dropped from 3.7 million tons in 1995 to 0.7 million tons in 1997. Since an important part of the catch of sardines was used to make fishmeal, Japan has tended to increase imports of fishmeal, principally from major fishmeal producing countries (Chile, Peru). Catches of the group of food fish comprising cod, pollock and hake declined from 1.2 million tons in 1989 to 0.4 million tons in 1997, at least partly as a result of the exclusion of Japanese fishing vessels from certain fishing grounds in the northern Pacific. Japanese imports, affected by national economic difficulties, declined in value from 2000 to 2003 and recovered slightly, but not to the highest levels achieved earlier, in the period 2004-2007. Despite these setbacks, Japan has remained the leading importing country in the world until 2007, when it was overtaken by USA. It is anticipated, however, that, even when the Japanese economy recovers, demand for imported fisheries products may not revert to earlier levels, as competing food products are eroding seafood's share of the Japanese food market.

Japanese consumers prefer the species and products from Japanese sources to which they are accustomed. Imported species tend to be thought of, at least initially, as substitutes for domestic species. Higher prices are often paid for fish caught by Japanese (as opposed to non-Japanese) fishing vessels, since it is considered that the catches are more likely to have been handled and conserved, by Japanese crews, as required by the trade and the consumers in Japan. Marine species are generally preferred to freshwater species.

Rising labour and other costs in Japan are leading to a tendency to undertake the processing of many seafood products in lower cost countries, often under joint venture arrangements with major Japanese retailers (department stores, supermarkets). Such products are exported to Japan either in semi-processed form or prepared for direct sale to final users (consumers, institutional buyers)

Although the Japanese authorities intervene where imported fishery products present risks to the health of the consumers (unauthorized additives, cholera), the principal difficulty faced by overseas exporters is to satisfy the Japanese buyers' requirements in respect of the freshness, presentation and correct workmanship of the products. Nevertheless, it is not unlikely that Japan will follow USA, the EU, Canada, and other market countries in imposing some form of Hazard Analysis Critical Control Point (HACCP) system.

In 2008 Japan imported fishery products with a value of JPY1,563,655 million, down 4.4 percent from JPY1,636,175 million in 2007 (INFOFISH Trade News, number 3/2008). In 2008 the leading group, by value, of imported products was shrimp and prawn with 11.7 percent, followed by salmon and trout with 8.3 percent.

## United States of America

Commercial landings of edible species by US fishing vessels increased from 3.1 million tons in 1999, to 3.6 million tons in 2005, but declined to 3.4 million tons in 2007.. As catches increased in the period 1999-2007, the volume of imports of edible species also increased, from 1.8 million tons in 1999 to 2.4 million tons in 2006 and 2007.



In USA the leading group of fishery products imported is shrimp in fresh and frozen forms. In 2007 shrimp was imported to a value of US\$ 3,896 million and accounted for 28 percent of the value of edible fisheries imports of US\$13,696 million (Fisheries of the United States 2007).

It is probably not incorrect to say that, in general, US consumers are less knowledgeable and less demanding in regard to fishery products than Japanese consumers. There is a general perception that US consumers prefer fish, the flesh of which should be white in color, have no bones and have a bland or mild (non-fishy) taste.

The prices paid in the US market for fresh (chilled, unfrozen) fish are generally higher than those paid for the same products and species in frozen form. US consumers and the US fisheries trade (as in Japan and many other countries) have a preference for the species to which they are accustomed. In the 1970s and 1980s, for example, the US market generally showed no interest in tilapia, even when it was offered at prices lower than the prices of other (well-known) species. The trade alleged that consumers did not know tilapia, so that it would need special promotion; that consumers preferred the taste of fish from the sea; and that tilapia had a lot of bones. Tilapia's reputation was not helped by the activities of some US traders, who tried to sell red tilapia under a number of illegal names, such as red snapper, in order to obtain higher prices. Nevertheless, when the supply of cod and other white-fleshed mild-tasting fish from Eastern Canada and North-Eastern USA declined, as fisheries were closed or limited in an effort to permit the regeneration of the resources, the market began to find tilapia of interest. Both the domestic production of tilapia (mostly sold in live form to Oriental markets in USA) and the imports of this fish (chiefly from farms in supplying countries in Latin America and Asia) have shown rapid growth. Until some years ago, catfish was generally considered to be a fish eaten only in certain of the southern states of USA by consumers from lower income groups. Farmed catfish is now successfully sold throughout the country, chiefly as a result of cooperative promotional efforts, the development of processed products and reasonable pricing policies.

Both tilapia and catfish meet the requirements of having white flesh. The problem of tilapia's so-called muddy taste has been solved through purging farmed fish, by giving it no feed for an appropriate period of time, before harvesting. Catfish have virtually no bones, except the backbone. In general, however, it is the view that it was the shortage of other well-known and valued species, rather than any specific characteristics or preparation of tilapia and catfish, which made it possible for tilapia and catfish to gain acceptance in the US market.

With the object of ensuring the safety of fisheries products, a HACCP-based system has been implemented in USA. It is obligatory, not only for the US domestic seafood industry, but also for all exporters in other countries who ship fisheries products to the US market.

Apart from the obligation to implement a HACCP-based system, there are few absolute requirements (chemical additives, heavy metals, coloring agents, levels of decomposition) in respect of quality. The standards of quality required are normally set by US importers or negotiated by them with their overseas suppliers.

The US Food and Drug Administration (USFDA) is responsible for ensuring, *inter alia*, that seafood imported into USA is not adulterated or mis-branded, in order that neither does it cause those who eat it to become ill nor does it lead those who buy it into believing that they

are purchasing something which it is not. Imported fishery products are inspected by USFDA at random at ports of entry, except that shipments from suppliers or from exporting countries where products have previously been rejected by USFDA may be subject to more frequent inspection, while the initial shipments of new suppliers are generally all inspected.

## **European Union**

The EU is a very large market, the member countries of which have widely differing preferences and needs. Common duty rates are applied to fisheries products which enter from outside the EU, while the member countries are working towards the harmonization of non-tariff rules and regulations. Within the EU, fishery products circulate freely between the member countries.

The nominal catches of the 8 leading European fishing nations have fluctuated, with an overall downward trend, in the period 1997-2006 (Table 4). The catches reported for 2006 of 4.2 million tons were 28 percent lower than the catches of 5.8 million tons in 1997. There have been, in recent years, substantial reductions in catch quotas, for reasons of conservation of stocks. The 6 leading European importing countries showed increases in the value of fishery products imported during the period 1999-2007 (Table 1). The combined imports of these 6 countries increased in value by 86 percent in that period from US\$15,635 millions to US\$ 29,010 millions. The EU has introduced a HACCP-based system, which must be implemented by overseas exporters shipping to the countries of the EU.

## **HAZARD ANALYSIS CRITICAL CONTROL POINT**

The Hazard Analysis Critical Control Point (HACCP) system is the basis for regulations on fish inspection adopted by USA, the EU, Canada and a number of developing countries. The object of the HACCP system is to assure the safety and sensory quality of fishery products and, in addition, it is aimed at reducing the failure costs in the fishery industry, including the reduction of post-harvest losses. The principal elements of the USFDA Seafood HACCP Regulation are:

- Identification of potential hazards; assessment of the risk or likelihood that they may occur.
- Determination of Critical Control Points (CCPs); determination of steps which can be controlled to eliminate or minimize hazards.
- Establishment of criteria, target levels and tolerances, which must be met to ensure that each CCP is under control.
- Establishment of a monitoring system for each CCP.
- Determination of corrective action to be taken when a CCP is not under control.
- Establishment of procedures for verification.

Table B-1

*World Imports of Fishery Products, by Value, by Leading Importing Countries, 1993-2007*  
(US\$ millions)

Country or Area	1993	1999	2002	2003	2004	2005	2006	2007
Asia								
Japan		14,749	13,646	12,396	14,560	14,438	13,971	13,242
China		1,127	2,198	2,389	3,126	3,979	4,126	4,538
South Korea		1,140	1,861	1,935	2,233	2,351	2,729	3,108
USA		9,405	10,065	11,655	11,967	11,982	13,271	13,664
EU								
France		3,281	3,207	3,771	4,176	4,562	5,069	5,388
Spain		3,287	3,853	4,904	5,222	5,632	6,359	6,988
Italy		2,729	2,906	3,559	3,904	4,224	4,717	5,160
Germany		2,289	2,420	2,635	2,805	3,235	3,739	4,298
United Kingdom		2,277	2,328	2,508	2,812	3,174	3,714	4,158
Denmark		1,772	1,806	2,085	2,286	2,555	2,838	3,018
Other							29,073	35,861
Total	44,567	57,684	61,604	67,359	75,436	81,529	89,607	99,423

SOURCE: Fisheries of the United States 2007 and earlier editions.

Table B-2

*Trends in Japanese Catches and Imports, 1989-2007*

Year	Aquaculture and Commercial Catches (million tons)	Imports into Japanese Market	
		Quantity (million tons)	Value (US\$ millions)
1989	11.9	2.3	10,127
1991	10.0	2.9	12,085
1993	8.7	3.1	14,187
1995	6.8	2.8	17,853
1997	6.7	2.8	15,540
1999	6.0	2.9	14,749
2000	5.8	3.0	15,513
2001	5.5	3.1	13,453
2002	5.2	3.1	13,646
2003	5.4	2.8	12,396
2004	5.4	2.9	14,560
2005	5.3	2.8	14,438
2006	5.3	2.6	14,025
2007	5.2	2.4	13,242

SOURCES: "Japanese Imports of Marine Products (Statistics)", Japan Marine Products Importers Association; "Annual Report on the United States Seafood Industry", various editions; "Fisheries of the United States", various editions; and FAO Fisheries Yearbook, various editions.

Table B-3

*Trends in US Commercial Landings for Direct Human Consumption and Imports of Edible Fishery Products, 1999-2007*

Year	US Commercial Landings for Human Food (million tons)	Imports of Edible Fisheries Products into US Market	
		Quantity (million tons)	Value (US\$ millions)
1999	3.1	1.8	9,014
2000	3.1	1.8	10,054
2001	3.3	1.9	9,864
2002	3.3	2.0	10,121
2003	3.4	2.2	11,095
2004	3.5	2.2	11,331
2005	3.6	2.3	12,099
2006	3.5	2.4	13,355
2007	3.4	2.4	13,696

SOURCE: "Fisheries of the United States", various editions.

Table B-4

*Nominal Catches of Leading European Countries, 1997-2006 (million tons)*

	1997	2000	2001	2002	2003	2004	2005	2006
Denmark	1.8	1.5	1.5	1.4	1.0	1.1	0.9	0.9
Spain	1.2	1.0	1.1	0.9	0.9	0.8	0.8	0.9
United Kingdom	0.9	0.7	0.7	0.7	0.6	0.7	0.7	0.6
France	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Netherlands	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4
Italy	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Portugal	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Germany	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.3
<b>Total (8 countries)</b>	5.8	5.0	5.1	4.8	4.4	4.5	4.3	4.2

SOURCE: FAO Yearbook of Fisheries Statistics, Summary Tables, Capture Production, 2006.

# Appendix C. International Markets for Shrimp

## WORLD TRADE IN SHRIMP

### Production

The world supply of shrimp increased from 1.1 million metric tons in 1970 to 1.7 million metric tons in 1980, live weight. Supply started to rise again, chiefly as a result of the increasing production of cultured tropical species. In 2000 world production reached 4.2 million metric tons and in 2006 was reported (FAO) to have reached 6.6 million metric tons. In 2006 the top five producing countries (China, Thailand, Indonesia, India, Vietnam) accounted for about 73 percent of world production. Assuming that the average price ex-vessel or at the pond bank in 2006 was about US\$3.00/kg, the total producer value of the world production in that year was about US\$20,000 million.

Shrimp are often not identified by species in national statistics, so one cannot quantify the share of each species in world production. Tropical species, from capture and culture operations, probably account for more than 90 percent of world supply, with the remaining 10 percent consisting of cold water species.

World catches by fishing vessels are believed to be close to their upper limit, since all major shrimp fisheries are thought to have been discovered and are being exploited, at least, to full or nearly full capacity. In 2006 landings from capture fisheries amounted to about 3.5 million metric tons, equivalent to a little over half of total world production. The production of cultured shrimp is reported to have increased from about 72,000 metric tons in 1980 to about 2.7 million metric tons in 2006, when it accounted for a little less than half of global production. It has been estimated that, in recent years, Asia has accounted for over 80 percent of world culture production.

It should be noted that there are no accurate statistics on world shrimp farming. How much farmed shrimp is produced each year? How many hectares are devoted to farming? How big will next year's harvest be? No one can be sure. In 2000 and 2001, after three years of good shrimp prices, new shrimp farming projects sprang up in many countries, particularly in Vietnam, Brazil and China. Brazil quickly became the low-cost producer in the Western Hemisphere, while farmers in Asia learned to produce high yields at low prices. Governments throughout Asia encouraged the development of shrimp farming with land concessions, tax breaks, loans, and technical assistance. Consequently, from 1999 to 2005, production of farmed shrimp is estimated to have more than doubled, from approximately 1.1 million metric

tons to an estimated 2.4 million metric tons. Then, in early 2000, shrimp prices crashed and have only partially recovered.

It is estimated that China now leads the production of farmed shrimp, surpassing Thailand, which held the lead in 1993-2000. With production costs of somewhere around a dollar a pound for small, whole shrimp, China was estimated to have produced 820,000 metric tons of farmed shrimp in 2006 and 900,000 metric tons in 2008. That same year Thailand produced about 420,000 metric tons of farmed shrimp, Indonesia about 470,000 metric tons, Vietnam around 360,000 metric tons, and India about 195,000 metric tons. In the Western Hemisphere, it was estimated that Ecuador produced 135,000 metric tons of farmed shrimp, Brazil 70,000 metric tons, and Mexico 50,000 metric tons.

## **Trade**

Trade in shrimp tends to flow from the producing countries to the nearest of the three major markets (Japan, United States, Western Europe). Proximity facilitates communications and the transportation, and reduces exposure to market fluctuations during transit. World shrimp exports in 2006, in all product forms, amounted to about 2.4 million metric tons, with a value of US\$14,138 million.

## **Major Markets**

The dominant market countries are Japan and the United States, which, between them, in 2006, accounted for about 39 percent of world imports of shrimp by quantity and about 47 percent in terms of value.

### ***Japan***

In 2000 Japanese domestic catches amounted to 27,300 metric tons and in 2006 to 22,900 metric tons, live weight, having declined from 60,900 metric tons in 1984. Culture production dropped from a peak of 2,800 metric tons in 1989 and appears to have stabilized at about 2,000 metric tons since 1996.

As imports of shrimp into Japan since 1986 have been at the rate of over 200,000 metric tons/year, product weight, it is clear that domestic production has a small role in the Japanese market for shrimp.

In 2007 the principal countries, which supplied the Japanese market, were Vietnam (40,000 metric tons), Indonesia (37,100 metric tons), India (27,000 metric tons), Thailand (26,400 metric tons) and China (24,000 metric tons). There is no quantitative limit on the import of shrimp into Japan. Import duties vary in accordance with international agreements, the degree of development of the exporting countries and the extent to which shrimp has been processed.

### ***United States***

In 2006 U.S. domestic landings of shrimp, principally from catches of tropical species, amounted to 132,600 metric tons, live weight. Production from coldwater fisheries and of cultured tropical species is small. Imports in 2007 amounted to 583,600 metric tons. The principal supplying countries in 2007 were Thailand (188,300 metric tons), Ecuador (59,200 metric tons), Indonesia (59,100 metric tons), China (48,400 metric tons), Mexico (40,600 metric tons) and Vietnam (39,300 metric tons). There are no duties, quotas, or quantitative

restrictions on imports of shrimp into the United States, except that it is not currently permitted to import shrimp from Cuba.

### ***Western Europe***

The western European market for shrimp has two segments. The Mediterranean countries prefer tropical species, much of which is required in head-on form. Northern European countries prefer coldwater species. Nevertheless, shortages of coldwater species have caused buyers in northern Europe to become interested in tropical species, for which the demand is generally in headless shell-on form.

Although, taken as a whole, the volume of consumption of shrimp in western Europe is approximately on par with consumption in the other two major markets, the consumption of individual European countries is very much less. The market characteristics of individual European countries vary widely, so that it is advisable to consider each country as a separate market for shrimp, small in relation to Japan or the United States.

Trade between the member countries of the European Union (EU) is duty free. Access from outside the EU and the tariff rates charged on imported shrimp vary according to a number of trading agreements, the degree of development of the exporting countries, and the species and processing of the shrimp. Although there is a common external tariff, there remain differences between member countries of the EU in respect of import and quality regulations, which are being harmonized.

### **Minor Markets**

Other (smaller) import markets include Australia, Canada, Hong Kong, Korea, Malaysia, Singapore, and Taiwan, most of which are also exporters.

### **Consumption in Producing Countries**

About half of world supply enters international trade and the remainder is consumed in the producing countries. Cultured shrimp is produced mostly for export, so that the supply to the domestic markets comes chiefly from capture fisheries.

### ***Product Forms***

Shrimp is sold in a number of forms of preservation –live, fresh, frozen, canned, and dried. Frozen is by far the most important. Product forms include whole head-on, headless shell-on, peeled, breaded, and cooked; other products include shrimp paste and shrimp crackers. Headless shell-on accounts for more than half of the imports into Japan and the United States, where it is processed by restaurants and specialized processing plants into a variety of peeled, breaded, and other products.

### ***Demand***

Shrimp is the highest value commodity in world fisheries trade, and in Japan and the United States it is the most important single seafood item in terms of value.

More shrimp is being sold for consumption at home, largely because lower real prices for sizes produced by culture operations allow retailers to offer shrimp at prices that make it competitive with other food products. Restaurants change menu prices infrequently, so

fluctuations in the prices of shrimp at importer, wholesaler, and distributor levels are not immediately passed on to consumers. Consequently, in a market where prices are dropping, demand tends to rise faster among retailers than institutional outlets.

Since a lot of shrimp is consumed away from home in major market countries, a key determinant of demand is disposable personal income. When economic conditions are good, more disposable personal income encourages consumers to eat away from home and demand for shrimp rises.

Lower prices for shrimp (in Japan and Europe at least partially the result of the strength of the currencies in relation to the US dollar) have brought shrimp within the reach of a wider range of consumers. Shrimp is now an item of popular demand as opposed to the luxury item it was during the 1950-1980 period.

World demand for shrimp is expected to continue to rise with continued population growth, n, rising levels of personal income, and competitive prices. Consumption in minor markets and in producing countries may rise faster than in the three major markets, owing to more rapid growth in population and number of potential consumers. Since their domestic production is not expected to show any growth, increases in demand in the major markets will have to be satisfied by imports.

## **Quality**

The single most important characteristic of any shrimp producer is reputation for quality. Products must be fresh and uncontaminated, uniform in size and color, with accurate size counts and correct net weights. As world production increases, exporters will face a highly competitive market in which quality will be very important. Even though strong demand for shrimp in export markets should be favorable for supplying countries, exporters will have to meet strict regulations intended to ensure that fisheries products are safe, wholesome, and honestly presented. Traditional fish inspection and quality control methods are being replaced by Hazard Analysis Critical Control Point (HACCP) systems, which exporters must implement if they wish to export to the United States, the EU, and Canada.

## **Prices**

Shrimp is normally traded between producing countries and the major markets in US dollars, even when the United States is neither buyer nor seller. When the currency of the importing countries is strong in relation to the US dollar, importers can pay higher prices in US dollars and/or sell at lower prices in the currencies of the market countries. Prices are negotiated between overseas exporters and importers in the market countries on the basis of outright purchase, although consignment and agency arrangements are also used. Payment is normally by means of letters of credit.

If importers buy outright, they take title to the merchandize at a specified point in time and from then on assume the risk that market prices may go up or down. When negotiating with exporters, therefore, importers aim for prices that cover direct costs, selling expenses, overhead, and interest on working capital employed; that provide a reasonable profit; and that include a margin to enable them to absorb market fluctuations.



In negotiating prices importers take into consideration time, distance, and quality and market risk. Evaluation of the market risk requires judgment regarding the changes in supply and demand for the period of time before the product arrives in the market countries. The prices at which importers buy are the result of their assessment of market prospects at the time when the merchandise can be expected to be available for sale in the market countries and the effect of competition from other importers, together with the risk that the quality of the product may be inadequate.

The prices at which importers sell are always the highest that the markets will bear at the time of the sale. Prices vary in accordance with product form, sizes, species or raw color, and the reputation of the country of origin and of individual exporters. Size is important in determining prices to producers, as well as to consumers. In general, the larger the shrimp the higher the price. The price for each size depends on the supply of, and demand for, that size. There can be substantial, and widely varying, differences in prices between sizes. When the price for a given size rises to a point at which users consider it uneconomic, the next higher count size is sometimes substituted.

Cultured shrimp is normally packed and frozen within a few hours of harvesting, so that its quality is often excellent. It has, within the limitations imposed by species and sizes, been well accepted in its penetration of the markets. In general, there is no differentiation in prices between shrimp of the same species and size, from capture fisheries and from ponds.

## **TRENDS**

### **Production**

World catches by fishing vessels are unlikely increase much so cultured production will be the source of supply growth. The profitability of shrimp fishing depends chiefly on catch volume, size breakdown, shrimp prices, and the cost of fuel and labour. Factors affecting the profitability of shrimp farming include the yield of shrimp per unit of pond area, sizes produced, shrimp prices, and the cost of feed, fuel and labour, which vary according to the technology used. The cost of construction and of financing capital assets is important to vessel owners and shrimp farmers alike. The cost of producing cultured shrimp is highest in intensive forms. Declines in prices have, at times, caused shrimp farmers in some producing countries to reduce the number of shrimps per unit of area, with the object of reducing costs, even though production yields were also reduced.

### **Organic Shrimp**

Organic or “ecological” shrimp are produced under completely natural conditions. The basic parameters for such production are:

- Large low-cost ponds.
- Ponds seeded at very low density (about 1-2 animals/m<sup>2</sup>).
- No feed, so very low production costs.
- Very low yields
- Large animals can be grown

Prices for organic shrimp, for the small volume of sales (about 200 metric tons, 2004) from Vietnam to the EU, Australia, and Japan, were reportedly 20 percent higher than for shrimp produced under conventional conditions.

Specifications for organic shrimp vary from one market country to another. In Mozambique, where organic shrimp is produced under French specifications, prices are currently (2009) reported to be 30 percent higher and ponds may be seeded at up to 20 animals/m<sup>2</sup> with a maximum production of 240 grams/m<sup>2</sup>. Although Vietnam expects to increase the area under organic cultivation from 4,000 ha to 20,000 ha, it is not yet clear that, generally, higher prices and lower production costs consistently compensate for lower yields.

## **Demand**

Per capita consumption in Japan in 1993 was about 2.7 kg, product weight (and is not thought to have changed much since then). In the United States per capita consumption was about 1.1 kg, but by 2004 had risen to 1.9 kg, meat weight. Such relatively low levels of consumption suggest supply and price constraints. Consumption of tropical species of shrimp is likely to grow in Europe, especially if supplies of slow-growing cold water shrimp remain stable or decline.

## **Product Forms and Value-added Products**

Processing plants in the major markets are being adversely affected by the rising cost of labor. Some processors purchase shrimp in peeled or other semi-processed forms from countries with lower labor costs. There has been some growth in the export of cooked shrimp and of raw shrimp prepared in individually quick frozen (IQF) form, but these remain a small part of international trade. Growth in cooked exports is constrained by authorities in the market countries, who believe that such products expose consumers to a higher risk of illness (from *Listeria monocytogenes*) than products imported raw and cooked in the market countries. Inspection of ready-to-eat products is very stringent.

Markets may pay a premium for IQF shrimp products but not always. There is no fixed differential which gives an price advantage to IQF products over shrimp frozen in blocks, since each product form has a separate market subject to supply of and demand.

Product diversification on the part of overseas exporters is considered to be positive. Great care is needed, however, to ensure that special or value-added products are prepared to the standards of quality required by the markets and that, once production of such special products has begun, buyers cannot back out of the arrangement. Close personal relationships between importers and exporters is essential to the successful development of value-added products.

## **Packaging**

The major part of world trade in shrimp is in 5 lb and 2 kg inner cartons. Exporting countries have tried to put shrimp into smaller packages suitable for retail outlets (e.g., fresh unfrozen shrimp in 8 oz airtight packages, frozen shrimp in 1 lb and 2 lb packages for sale in supermarkets in the United States, frozen shrimp in small packages for sale in department stores in Japan, and whole head-on shrimp in retail packs for the EU). Some IQF shell-on shrimp has been packed in bulk for U.S. supermarkets. Modified atmosphere packaging has

been used to extend the shelf life of fresh shrimp. This specialized packaging, however, has had little impact. Specialized packing and repacking still takes place largely in the market countries for a number of reasons: vested interests in processing facilities in the market countries, concerns about standards of quality in the exporting countries, and the need to respond quickly to changes in demand.

### **Brand Names and Promotion**

All shrimp imported into the major markets is traded under the brand names of the overseas exporters. No exporter has a dominant share in any major market. Brand names and packaging do not have the same significance in the restaurant and institutional trade as they do at retail. Exporters' brand names identify their product to the trade in the market countries, by calling to the mind of those concerned the processors' reputation in the market for consistent good quality, accurate counts and weights, and uniformity of size and color. Substantial quantities of shrimp are sold, thawed, in supermarkets and retail outlets without brand identification.

### **Distribution**

The same distribution channels are used in the market countries for domestic and imported shrimp, whether shrimp are from capture fisheries or cultured shrimp. The distinctions between importers, wholesalers, and distributors are not always clear. Some companies assume more than one, or even all, these functions. When, as a result of increased competition in the markets, there has been pressure on profit margins in the trade, the functions of the trade intermediaries have tended to become blurred, resulting in efforts to try to reduce the number of links in the chain of distribution. There have also been attempts by those in the trade to strengthen their position by means of mergers or acquisitions.

### **Certification**

There is growing demand in world markets for shrimp which is safe and wholesome and which has been produced in an environmentally and socially responsible manner. Organizations have been set up to certify social, environmental and food safety standards. These may combine site inspections and effluent sampling with sanitary controls, therapeutic controls and traceability. One such organization – Aquaculture Certification Council – offers a process, as opposed to a product, certification. This is oriented towards seafood buyers, not consumers.

## **JAPANESE MARKET**

### **Supplies**

Landings of shrimp from domestic capture fisheries reached a high point of 62,400 metric tons in 1983, since when they have declined. In 1998 the total Japanese catch was 27,400 metric tons and in 2006 was 22,900 metric tons, live weight. Domestic catches of shrimp are thought to have reached maximum levels of production, so that no increase in landings can be expected.

Culture production dropped from a peak of 2,800 metric tons in 1989 and appears to have stabilized at about 2,000 metric tons since 1996. It is not expected to increase, owing to lack

of suitable production areas; anticipated increases in supply from overseas producers; and rising production costs.

Imports of shrimp increased steadily in the period 1985-95. In 1998 and 1999 they were adversely affected by the sluggish economy in Japan. By 2007 Japanese imports of shrimp had still not recovered to earlier levels. (It should be noted that shrimp and lobster are referred to by one name (*ebi*) and sometimes lobster is included with shrimp.)

Imported shrimp has obtained an increasing share of supply to the Japanese market and in recent years is reported to have accounted for more than 90% of the total supply of shrimp. The species traditionally consumed in Japan were *kuruma* shrimp (*Penaeus japonicus*) and the Chinese white shrimp (*P. chinensis*), also referred to as *taisho* shrimp. When catches of these species became insufficient, Japanese importers sought additional supplies of the same species of white shrimp in China and of other species of striped shrimp to substitute for *kuruma* shrimp.

Asia is the principal source of supply to Japan of tropical species, while coldwater shrimp are supplied chiefly by North Atlantic countries. Indonesia was the leading supplier to Japan from in the period 2001-2003, when it was overtaken by Vietnam. Increases in shipments to the Japanese market have come chiefly from countries producing cultured shrimp, such as China, Indonesia, India, Vietnam and Thailand.

The increases in imports of shrimp have been caused by increased demand, resulting from rising incomes and the movement of the population into urban areas. Furthermore, the appreciation in the value of the Japanese currency caused increases in import prices in US dollars and reductions in those prices in Japanese yen.

Import duties are levied on shrimp in accordance with the extent to which it has been processed, the degree of development of the exporting countries and international agreements. There are no restrictions in respect of the quantities of shrimp, which may be imported.

The quarantine office may check imported shrimp, by sampling if necessary. Where it is known that there are cases of cholera in an exporting country, all shipments from that country must be checked. Certain additives are permitted, such as sodium bisulfite up to 100 ppm. The use of boric acid is forbidden. The authorities have tested shipments of shrimp for pesticides and herbicides, as a result of the occurrence of this type of agricultural pollution in cultured shrimp.

## Consumption

Annual per capita consumption of shrimp fluctuates, in relation to the state of the Japanese economy, at about 1.5 kg, edible meat weight. There has been a marked change in the pattern of consumption. In 1982 it was reported that institutional consumption accounted for 75% of total usage, with only 25% of shrimp consumed at home. Recently the ratio of commercial use to home consumption is considered to be about 50:50. Declines in prices have made it possible for retailers to offer shrimp at prices which have enabled shrimp to compete with other food products.

About 70% of shrimp is consumed in raw headless shell-on form. Whole head-on shrimp accounts for about 10% and peeled (PUD) shrimp accounts for less than 1%. The sizes

preferred for sale at retail are 36-40 to 71-90 headless count per lb, while the larger sizes are mostly used by institutional outlets. Processors use mostly the smallest sizes.

Low prices and the development of new products have led to increases in institutional consumption. However, the principal share of the growth in consumption in the Japanese market has been in the retail sector, where lower prices have caused shrimp to become available to a wider range of consumers. Japanese consumers prefer, and sometimes pay substantially higher prices for, fish and fisheries products caught by Japanese fishing vessels or otherwise produced by Japanese. Imported fisheries products are often considered inferior substitutes for domestic products.

### **Traceability**

Consumers have become more aware of issues regarding food safety. Providers and importers have been moving to implement traceability programs, which disclose the history of production and processing of the products marketed.

### **Quality**

The Japanese market is very strict with respect to product quality and standards compliance issues. Suppliers must ensure that their products meet market expectations in terms of freshness and sizes.

### **JETRO Marketing Guidebook for Major Imported Products**

JETRO publishes a Marketing Guidebook for Major Imported Products, which includes a section on shrimp (and crabs). The English version, published in 2002, and the Spanish version, published earlier, are the most recent versions available in electronic form. The version published in 2005 cannot be down-loaded, but can be purchased on line at a price of approximately US\$100 per copy. JETRO's web site is [www.jetro.go.jp](http://www.jetro.go.jp)

### **U.S. MARKET**

In terms of the first hand value of US domestic trade in fisheries products used for human consumption, shrimp is the leading group of species. The value of the domestic production of shrimp increased from US \$0.4 billion in 1980 to US\$0.7 billion in 2000, but declined to US\$0.4 billion in 2004. The value of shrimp imports in the same period rose from US \$0.7 billion in 1980 to US\$3.8 billion in 2000, declined to US\$3.4 billion in 2002 and recovered to US\$3.7 billion in 2004.

Domestic trade in shrimp of US \$1.0 billion in 1980 accounted for 26% of the total value of domestic trade of US \$3.9 billion in all species used for human consumption. By 1990 shrimp accounted for 35%. By 2000 the share of the value of domestic trade accounted for by shrimp had further increased to 41%, but by 2004 had declined to 36%.

There is no reason to suppose that the value of trade in shrimp will not continue to grow at a generally faster rate than that of seafood in general, in view of the expected increases in the supply of cultured shrimp.

## Domestic Production

Until 1981 domestic landings of shrimp from fishing vessels usually accounted for about half of the total supply to the US market and the remainder was imported. Since 1983 the share of domestic landings has declined to less than one quarter of total supply, chiefly as a result of increases in imports.

Domestic catches of tropical shrimp from the wild are thought to have reached maximum production levels. Domestic landings of coldwater species have declined sharply since reaching a peak in 1977. The decline in the landings of coldwater species is attributed to an increase in finfish predation on shrimp in Alaska.

The fishery for tropical shrimp has been affected by increases in the number and size of boats in the US fishery, which has led to a decline in catch per unit of effort, since total catches have remained essentially stable. Production has also been affected by rising operating costs.

The principal tropical species caught are white shrimp (*P. setiferus*), brown shrimp (*P. aztecus*) and pink shrimp (*P. duorarum*), and from northern waters the coldwater shrimp (*Pandalus borealis*). Farming of marine species of shrimp in the USA has not yet proved commercially successful on a large scale. The total supply from domestic sources will fluctuate from year to year, but cannot be expected to show any substantial increases. The balance required must continue to come from imports.

## Imports

Imports of shrimp into the US market grew rapidly from 163,300 metric tons in 1985 to 556,000 metric tons in 2007, product weight. Latin America traditionally provided the major part of imports into the US, but in recent years has been overtaken by Asia. Asia's strong position has been largely the result of the growth of exports from Thailand of cultured Black Tiger shrimp (*P. monodon*), from 25 million lbs in 1985 to 279 million lbs in 2000 and 291 million lbs in 2004.

China's exports, chiefly of cultured white shrimp, have been characterized by wide fluctuations, as crops have prospered or failed. The principal species exported is white shrimp (*P. chinensis*). This species has traditionally been caught by Chinese fishing vessels, but in recent years a rapid increase in culture production has taken place.

Other major Asian exporters of shrimp to USA are Thailand, Indonesia, and Vietnam. Increases in supplies from India, Indonesia, Vietnam and Bangladesh have been chiefly of cultured Black Tiger shrimp (*P. monodon*), although there have been increasing quantities of cultured white shrimp (*P. vannamei*).

Cultured shrimp is seen as the principal source of growth of production, especially in headless form, in Latin America. A limiting factor for cultured shrimp, however, is the range of sizes produced. In Latin America the best economic return with current technology is normally obtained by growing the white shrimp to sizes corresponding to from 21-25 to 41-50 headless shell-on count per lb, with a high percentage of 31-35 and 36-40 count shrimp.

The Indo-Pacific region exports shrimp to Japan, but has become, as has been seen, the largest supplier to the US market. This is especially so at times of weakness in the Japanese market, such as has been the case during Japan's recent economic difficulties.

Imports of shrimp by product type show clearly the dominating importance of the headless shell-on form, which accounted for 43% of all imports in 2007. However, while raw headless shell-on shrimp continues to be the principal product form of US imports, raw peeled shrimp has gained market share in recent years, accounting for 32% in 2007. The significant share of other products in 2007 probably consists chiefly of cooked and peeled shrimp.

There is no statistical information on imports in terms of species. However, it is generally considered that the major part of headless shell-on Asian product is Black Tiger shrimp (*P. monodon*), while from the Americas the principal species is the white shrimp (*P. vannamei*).

## Exports

Exports have a minor role in the U.S. shrimp trade. Canada is the principal export market for shrimp, followed by Mexico.

## Cultured Shrimp

There are no statistics which show separately the volumes or value of cultured shrimp. It is believed that well over 50% of imports are cultured species.

## Structural Characteristics of the US market

### Species and Colors

The industry refers to shrimp by color then by country of origin. There is no statistical information on quantities in terms of species, nor is it usual in the trade for the scientific names of species to be used. There are regional preferences in the US market for shrimp by colour of the headless shell-on raw product. Whites are preferred in the northeast and on the Pacific coast; browns in the mid-west; pinks in the northeast.

#### *Principal Species of Shrimp in the U.S. Market*

Origin	Common Name	Scientific Name
Gulf of Mexico	White	<i>P. setiferus</i> , <i>P. schmitti</i>
	Brown	<i>P. aztecus</i>
	Pink	<i>P. duorarum</i>
North Atlantic and North Pacific	Pink	<i>Pandalus borealis</i>
West Coast of Central and South America	White	<i>P. stylirostris</i> , <i>P. vannamei</i> , <i>P. occidentalis</i>
	Brown	<i>P. californiensis</i>
Caribbean and East Coast of South America	Pink	<i>P. brasiliensis</i> , <i>P. notialis</i>
	White	<i>P. schmitti</i>
India and Southeast Asia	White	<i>P. indicus</i> , <i>P. merguensis</i> , <i>P. vannamei</i>
	Black Tiger	<i>P. monodon</i>
People's Republic of China	White	<i>P. chinensis</i>

In the US market Black Tiger shrimp (*P. monodon*) were virtually unknown until increased culture production in SE Asia, initially in Taiwan and the Philippines, caused exporters to

ship to the USA. Priced lower than other species, Black Tiger shrimp were able to overcome, to a considerable extent, the trade's resistance to striped species. In 1989 weakness in the Japanese market caused exporters in Thailand, the Philippines and Indonesia to increase the quantities shipped to the US market, where Black Tiger shrimp has now achieved a strong position.

### **Sizes**

Size has always played an important part in determining prices to the producer, as well as to the consumer. It is generally true to say that the larger the shrimp the higher the price for which it sells. The larger sized shrimp are usually higher in price because they tend to be less abundant; they require less labour to process; and consumers prefer them. Shrimp is graded for the US market in groups of sizes expressed as count per lb. The price for each size will depend on the supply of and demand for that size. As a result, there can be substantial differences in prices between sizes. When the price for a given size rises to a point where users consider it uneconomic, the next higher count size may be substituted.

### **Product Forms and Value-added Products**

The most important product form is headless shell-on shrimp. Raw headless shell-on shrimp is bought by restaurants and institutions that prefer to process it themselves. Breaded shrimp is produced by processors in the south and east o and along the Pacific coast. Headless shrimp is peeled, leaving the tail and last segment of the shell in place, then de-veined. It is dipped in batter and coated with breadcrumbs, packed and frozen. Breeding plants prefer 26-30 to 41-50, headless shell-on count per lb; some smaller sizes are used. About 30% is sold at retail and 70% to restaurants and institutions.

The market for breaded shrimp has shown some growth in volume in recent years. Individually quick frozen (IQF) shrimp is used in cocktails and salads in restaurants and institutions. It is also sold at retail, some cooked and some raw. Both breeding and cooking plants are being adversely affected by high labor costs. As a result, processors are increasing their purchases of peeled shrimp from countries where labour costs are lower. For breeding purposes this is chiefly peeled tail-on butterfly shrimp in block form. Cookers are importing this product to cook in their own plants and they also buy cooked and peeled tail-on shrimp, chiefly from Asia. In this highly competitive segment of the seafood industry, profitability depends very largely on the cost at which raw material is purchased. The fact that a number of processors have gone out of business indicates that profits have been inadequate. Peeled and de-veined (P&D) and peeled undeveined (PUD) shrimp are used for cocktails and salads.

Small shrimp, both tropical and coldwater, are canned and used chiefly in soups, cocktails and salads. Small-sized raw PUD shrimp are cooked for sale in supermarkets and other retail outlets. Larger sizes are cooked and peeled for distribution to retail outlets and restaurants.

Relatively small quantities of shrimp are sold in whole head-on form, chiefly to the Chinese trade.

### **Brand Names**

Since the final consumer does not see the shrimp in its package, brand names and packaging do not have the same significance in the restaurant and institutional trade as they have in the retail trade. Exporters' brand names identify their product in the trade in the US and call to



the mind of the buyers the characteristics of the packers' reputation in the market place for consistent quality, counts, weights, and uniformity of size and color.

In retail markets frozen shrimp is sold in attractive and colorful packaging, in which the brand name is prominent. It is usually one of a line of products sold by a major seafood company, which sells its products in supermarket chains and other retail outlets. To keep the brand name before the public, promotion and advertising are required. Brand names used are those of the major seafood marketing organizations, which, in regard to frozen shrimp, are usually US companies. Some supermarkets prefer to market under their own brand name. A substantial quantity of shrimp, mostly thawed, is sold over the counters of supermarkets and retail shops without brand identification.

The best-known group of brands in the US market is used on the packaging of shrimp imported from Mexico and marketed by Ocean Garden Products.

The Ocean Garden brand has been on the market for over 50 years; the Mark and Compass brands for over 30 years. Ocean Garden Products is the largest importer of shrimp in USA and has national distribution. It was owned by the Mexican government (but has been sold to a group of private Mexican companies) and acts primarily as sales agent for the Mexican fishing cooperatives. No other brands exert an influence in the US market in the way that the Ocean Garden brands do.

With the exception of Mexican products, virtually all imported shrimp is sold under the exporters' brand names. No single overseas exporter has a significant share of the US market. A great many new exporters' brands have entered the US market in recent years. In addition to normal daily trade contacts, some exporters have promoted their brand names by means of advertising in trade journals and by being present at trade fairs and conferences.

### ***Packaging and Labeling***

Frozen shrimp traded in the US market is normally packed in wax impregnated inner cartons, containing a net weight of 5 lbs. Ten inner cartons are placed in a master carton, with a net weight of 50 lbs. Master cartons are usually double strapped, with non-metallic strapping, cross hatch. Inner cartons of 2 kg and 2 lbs are also used, but the standard packaging of ten 5 lb inner cartons is preferred, as it is customary to manage inventories in such units.

Packaging materials are checked by USFDA to ensure that no foreign substances contaminate the contents. Rigid standards for labeling are applied. Food products imported into the United States must have the name of the product; the country of origin; the name and address of the producer or distributor; and the net weight of the contents in pounds and ounces. All information must be in English or, if any foreign words are used, the English equivalent must also be shown. Any preservatives used must be listed. For frozen shrimp it is customary to show count sizes, product forms, and species. USFDA, if requested, will review proposed labels.

### ***Distribution Channels***

The same distribution channels are used for both domestic and imported shrimp. Importers may sell shrimp directly to processors, wholesalers, traders, distributors and restaurant and supermarket chains, or may sell through market brokers.

### ***Standards, Product Quality and Government Inspection***

US government standards exist for grades of frozen raw headless and breaded shrimp. They are not mandatory. The Codex Alimentarius Commission of the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) have published Recommended Standards for Quick Frozen Shrimps and Prawns and Recommended International Code of Practice for Shrimp or Prawns.

The single most important characteristic of any producer of shrimp is a reputation for outstanding quality. Until a producer has established a firm reputation for consistently good quality, buyers will only make a commitment subject to approval of samples. It is customary for buyers to take samples when a shipment has been received. Shrimp is checked organoleptically for smell and taste, also for weights, counts, and uniformity of size and color.

The USFDA is the government entity responsible for ensuring product purity and safety. Samples of inspected shipments are sent to FDA laboratories, where they are analyzed for bacteria, salmonella, decomposition, filth, additives, and foreign substances. Decomposition and the presence of undeclared or prohibited additives have been the primary reasons for FDA rejections of foreign shrimp. FDA normally inspects imports at random. Failure to pass inspection frequently results in the requirement to remove the product from USA.

Sodium bisulfite is a preservative used by shrimp industries worldwide to retard the development of black spot (*melanosis*). A residual amount of up to 100 ppm of sodium bisulfite is permitted. For residual amounts up to 10 ppm no declaration is required, but for residual amounts of 10-100 ppm it is necessary to label the shrimp as containing this chemical.

### ***Customs Duties, Entry Requirements and Ports of Entry***

Shrimp imported into USA must be cleared through US Customs. There are no import duties, quotas or quantitative restrictions on the entry of shrimp into USA. The import of shrimp from Cuba is not, however, currently permitted. Foreign shrimp products most commonly enter USA through the ports of New York, Miami and Los Angeles-Long Beach.

## **Mechanics of the US Market**

### ***Import Procedures***

New York, Chicago, Miami and Los Angeles are the principal centers of activity in the trading of both imported and domestic shrimp. Shrimp imports usually follow one of the three following procedures:

1. Outright purchase. The full amount of the negotiated price is paid by means of a letter of credit or telegraphic transfer. Payment is often subject to passage by USFDA.
2. Consignment. An advance is made to a producer, by means of a letter of credit, of about 60-80% of the estimated value of the product at the time of shipment. The remainder of the price is remitted to the producer after the product has been sold in the USA and after direct costs, together with the agent's commission, have been deducted from the proceeds.

3. Agency. The sale is made by an agent in the US to a customer who opens a letter of credit in favour of the producer. The agent's commission may be paid by either the buyer or the seller.

In all procedures risk, time and distance must be assessed. Evaluation of the market risk requires judgment regarding possible changes in demand and supply for up to 3 or 4 months in advance. Financing is required for up to 3 to 5 months before sales are made and money collected from US customers. Importers usually finance rejection insurance, ocean freight, marine insurance, trucking, handling and storage costs. In recent years the number of rejections of shrimp by USFDA has forced underwriters to increase the rates for rejection insurance and many now refuse to provide such coverage. The charges paid by importers vary from port to port.

Many shrimp exporting nations have stringent rules in respect of export practices. These sometimes include a requirement that prices be set before shipments are made. Some countries set quality requirements and minimum sales prices. Most of the major shrimp exporting countries also require that payment be made for the product at the time it is shipped. To do this, buyers open irrevocable letters of credit in advance of shipping.

Importers normally buy on the basis of C+F or CIF US port. They sell either ex the cold storage warehouse in which the shrimp has been stored after unloading from the ship or delivered to their customers.

### ***Market Risk and Importers' Margins***

When importers buy shrimp outright, they take title to the product and assume the risk that the market may go up or down. When negotiating with producers, importers try, therefore, to obtain prices which will enable them not only to cover the direct costs, selling expenses and overhead, interest on working capital employed and a reasonable profit; but also to include a margin to absorb market fluctuations.

If importers act as agents for producers under a consignment arrangement, they customarily charge back to producers all direct costs and interest charges and receive a commission, with which they must cover their selling expenses and overhead and make a profit; in this case the producers assume the risk that the market may go up or down. Margins and commissions are negotiable and vary greatly. On average, importers expect to have a gross margin of about 3% of the selling price after absorbing all direct costs, which results in a profit after taxes of about 1%.

#### *Shrimp Importers' Average Income and Costs (%)*

Importers' selling price	100
Cost of goods sold	(90)
Direct expenses (storage, transportation, Customs broker, sales commission, insurance and interest on working capital)	(7)
Gross margin	3
Overhead (salaries, travel and office costs) and taxes	(2)
Profit, after tax	1

***Methods of Selling, Pricing Considerations, and Terms of Payment***

Importers sell shrimp directly or through market brokers to processors, restaurant and supermarket chains, wholesalers, traders and distributors. Processors normally buy from importers, but also, in some cases, from overseas producers. They generally prefer to use importers to finance and handle importation and assume the quality risk.

Importers sometimes make use of market brokers to sell in markets in which they themselves are not active, paying a commission of about 1% for their services. Market brokers do not finance the product, but otherwise perform all the services for the customers which the importers would perform. Market brokers normally look after inventories in local warehouses and keep the importers supplied with market information. Market brokers sometimes guarantee the collection of accounts receivable, in which case the commission rate is 2% or more.

Commissions are negotiable and depend on such factors as the volume of product to be handled, the quality image of the exporter's brand(s) and the reputation of the importer. When dealing directly with restaurant and supermarket chains, importers often sell in truckload quantities. The shrimp is directed to the customer's designated warehouse, sometimes right from the dock at which it has arrived in the United States.

Importers' selling prices are essentially the same to all customers; they are always the highest the market will bear. Variations in price for the same color and size reflect the reputation for quality and reliability of the producers and not the customers to whom the product is sold. However, importers sometimes find it necessary to give a discount for volume, when selling large quantities, to customers who maintain continuity in the purchase of product and who pay promptly and reliably.

It is customary for importers to receive payment 30 to 60 days from the date of invoice or of receipt of goods by the customers, whichever is the earlier. When markets are difficult, as a result of price declines and reduced margins of profit in the trade, importers find that their customers tend to delay payment beyond the normal period and, in some cases, fail to pay at all.

***Wholesalers and Distributors***

The distinction between wholesalers, distributors and importers is not always clear, since there are companies which assume more than one of these functions. Wholesalers normally have their own warehouse, where shipments are received and broken down into small lots. Most wholesalers deal in a range of other products in addition to shrimp. Distributors deliver with their own trucks to restaurants and retail outlets, also frequently to individual units within restaurant and supermarket chains, a range of products which includes shrimp. The wholesale and distribution functions, together, work on margins ranging from less than 10% to over 30% between buying and selling prices. Many brokers, wholesalers and traders buy and sell shrimp among themselves and the rest of the seafood trade. This speculative activity is undertaken even though their main business is in obtaining shrimp and selling it to their customers.

***Prices, Price Negotiation, and Price Information***

In the United States there is no organized shrimp market or marketing exchange and so no set mechanism for determination of prices. Keen competition between importers, as well as US laws forbidding collusion in the setting of prices, make price fixing for shrimp, whether for the purchase of domestic or imported product or for the sale in the United States of such products, impossible.

Shrimp prices used to follow a distinct seasonal pattern during the year. Prices were low during the summer months when domestic production was at its peak and high during the winter and spring months when both domestic landings and imports were seasonally low. The prices for imported shrimp tended to follow a similar pattern to domestic prices.

Domestic production is no longer the principal factor affecting prices. The rapid growth in imports has reduced the influence of domestic production on prices. The overall supply of each size now appears to be the major factor in determining prices for each size. Since shrimp is grown all year round in Central and South America and other tropical countries, a more even flow of cultured shrimp into the US market has tended to counter the fluctuations in supply from the seasonal catch fisheries.

Although the long-term movement of prices for all sizes is generally in the same direction, in the short term the price trends for individual sizes will vary as to timing and amount. Indeed, there have been times when some sizes have moved up in price while others were declining. Shrimp prices in the US have tended to rise and fall with the general upturns and downturns in the economy. Prices, for imported shrimp, are usually initiated by the producer, who makes an offer. The importer either accepts or makes a counter offer. Nevertheless, in Ecuador, for example, the practice has developed by which negotiations start with producers receiving bids from their buyers. Terms, such as payment arrangements and the timing of shipments, may also affect the final agreed price.

When the product arrives and, having passed USDA, is available for sale, the importer offers it to the trade at the highest price he thinks the market will bear. By a process of negotiation and bargaining, a price is reached at which a sale is made. Other importers become aware of the price at which the business has been transacted and this price then becomes the current trading level. Importers provide market information to the producers from whom they buy, so that the new market price is reflected in the producers' next offer.

Prices of shrimp depend upon the size of the individual shrimp, the species, quality and source. Prices are affected by the quality record and dependability of the producer. Prices are also affected by, amongst other things, competition for world shrimp supplies; inflation and instability in the world economy; fluctuations in the relative values of various currencies, particularly the US dollar and the Japanese yen; and fluctuations in the cost of money.

The structure of prices in the shrimp market depends on the relationships of sizes, colors, product forms, and countries of origin. In general, the larger the shrimp the higher the price it sells for. There can be substantial differences in prices between sizes. Furthermore, these differences are not constant, but will fluctuate according to the supply of, and demand for, each size. White shrimp generally command a premium price over other colours. Pinks are normally worth less than whites, but more than browns. Striped shrimp usually sell at prices below other species. A substantial price differential exists between freshwater and marine

species. The characteristic texture and taste of freshwater shrimp find a low level of acceptance in the US market.

There is a basic relationship between product forms, which depends on the quantity of shrimp meat. Thus, the price for P&D shrimp should be higher than headless shell-on shrimp to the extent of the loss in weight caused by removing the shell and the additional cost of labour. In practice this relationship is often overridden by factors of supply and demand.

The same species and size of shrimp, when packed in two different countries, may command quite different prices in the market, and reflect the producers' reputation for good weight and quality, accuracy of counts and uniformity of size and color.

Wholesale shrimp price information is collected by the New York office of the National Marine Fisheries Service (NMFS) of the US Department of Commerce (USDC) by means of a survey by telephone of leading importers and wholesalers. This weekly information, known as the Green Sheet, is not a record of sales made or of business done, but rather a tabulation of views from many sources. Since the price information is provided chiefly by importers and other buyers, overseas exporters are best advised to use it only as a guide and market indicator and not as the basis for contractual agreements. This information was published by NMFS in the New York market newsletter, until this was discontinued in 1989. It is now available from Urner-Barry.

The fluctuations of prices in the US market can best be seen by looking at data for white shrimp from Central and South America, since these are the products which have, except during periods when production was adversely affected by disease, been traded most consistently throughout the year, in headless shell-on form and in whole head-on form.

Bearing in mind the limitations recommended in making use of prices in the Green Sheet, exporters may calculate the FOB value of their products by deducting from the New York wholesale prices the cost of Customs brokerage, the first month's cold storage, drayage, marine and rejection insurance, marine freight, interest on working capital and export duties in the country of origin, together with the importer's margin or agency commission. Since these expenses vary widely in accordance with the port of destination, the elapsed time from shipment by the exporter to arrival in the US, the cost of money and arrangements with the importer, no generally applicable relationships can be established between Green Sheet prices and exporters' prices.

Other published information on prices is available from several sources, and can be obtained by mail, telefax or e-mail. Urner-Barry's Seafood Price Current is sent out to subscribers two times each week and provides selling prices, of firsthand receivers ex warehouse, of shrimp from domestic and overseas suppliers.

Shrimp World Incorporated publishes a monthly market news analysis (Shrimp Notes) of the US market, which illustrates and analyzes all the factors which may affect shrimp prices, including volumes and any other elements which contribute to the volatility of the US market. Included in the analysis are cold storage holdings and imports, together with information on supply and demand. All these factors are taken into consideration when any analyses or projections are undertaken of the situation in the US shrimp market. Shrimp Notes is to be found on the company's web site SHRIMPCOM ([www.shrimpcom.com](http://www.shrimpcom.com)).

INFOFISH Trade News is published twice each month and gives price information and general comments on the markets for shrimp in USA, Japan and Europe.

### **Consumption Patterns**

**Recent Trends.** Annual per capita consumption of all preparations of shrimp, edible meat weight, increased from 1.4 lbs in 1980 to 4.7 lbs in 2008.

*Annual Per Capita Consumption of Shrimp in All Preparations, Edible Meat Weight(pounds)*

<u>1980</u>	<u>1990</u>	<u>2000</u>	<u>2008</u>
1.4	2.2	3.2	4.1

SOURCE: Fisheries of the United States, various editions

Inventory levels fluctuate in a seasonal pattern in relation to US domestic landings and the level of imports. Inventories are drawn down during the first half of the year, when both domestic landings and imports are light. Stocks are built up during the second half of the year when domestic catches and imports, especially from Mexico, are strong. Inventories normally average less than one month's consumption.

**Regional Preferences.** The principal factors affecting regional demand for shrimp are the number of consumers and the level of their personal disposable income. The principal concentrations of population are in the northeast states (New York, Philadelphia, Boston and Washington, D.C.), in California (Los Angeles and San Francisco), in the northern central states (Chicago and Detroit) and in Texas (Houston and Dallas). The states with the highest average wage, and so, presumably, the highest level of personal disposable income, are Alaska, New York, Michigan and California. In the NE states there is a market for large white shrimp in shell-on form and pinks are also popular in this area. There is demand in California for large shell-on white shrimp, preferably imports from the west coast of Mexico. The north central states prefer brown shrimp, which have historically been supplied from the US Gulf of Mexico fishery.

**Institutional Consumption.** It is believed that more than two-thirds of all shrimp is eaten in restaurants and institutions. Restaurants in the US are broadly divided in to 3 categories.

- **White tablecloth restaurants** charge high prices and serve dishes which often require sophisticated preparation. Such restaurants serve sizes U-15 to 21-25 in shrimp cocktails and high count small shrimp in salads. Large sizes, from U-5 to 21-25, are prepared in various forms as main dishes.
- Medium-priced **family style restaurants** are important users of shrimp. They buy principally sizes 16-20 to 41-50, together with higher count shrimp for salads.
- The lower-cost **fast food restaurants** for the most part do not serve shrimp for reasons of price, continuity of supply and handling.

The trade usually refers to 16-20 count and bigger shrimp as large sizes; 21-25 to 36-40 count shrimp as medium sizes; and the remainder as small sizes.

Restaurant chains may fall into any of the 3 categories. There are chains whose activity is limited to a certain area or region. Such chains may have from 3 to 100 units and their requirements for shrimp are generally serviced by distributors. National chains cover the

whole country. They often have central warehouses, from which they make their own distribution to their restaurants; sometimes this is contracted out to a specialized distribution/trucking service. National chains, as a rule, have centralized purchasing and tend to buy directly from importers and processors.

A large segment of the industry providing meals away from home services institutional establishments, such as lunch rooms and cafeterias in manufacturing and commercial facilities; government ships, stores and commissaries, hospitals, prisons and schools; and private hospitals, schools, clubs and retirement homes. This market is largely untapped for consumption of shrimp, which has historically been too expensive.

Portion control is basic to a successful restaurant operation. For this reason, restaurants usually buy only one or two sizes of shrimp. The sizes vary from restaurant to restaurant in accordance with the chef's requirements for his clientele and the economics of each dish.

Restaurants calculate their menu prices by using a factor of 2-4 times the cost of raw material. Nevertheless, since shrimp is often a key item on the menu, it may be marked up less than other ingredients. Since menus are printed infrequently, margins vary, as the menu price is fixed even though the restaurant's buying prices fluctuate.

**Retail Outlets.** Probably less than one-third of all shrimp is sold through retail outlets, such as supermarkets, grocery stores and fish shops. Much of this is shrimp which has been processed into forms such as cooked and peeled shrimp, IQF P+D raw shrimp and raw breaded shrimp. Most frozen shrimp is sold under the label of the US processors or re-packers. Shrimp is sometimes re-packed from the standard 5 lb. block into smaller units, in order to provide quantities required by the housewife and to reduce the unit price.

Shrimp is also frequently displayed thawed on fresh fish counters without brand identification. There is interest among retailers to expand their sales of shrimp. Alternative methods of presentation, handling and packaging have been introduced, including the use of shell-on shrimp in IQF form. One of the major supermarket chains calculates selling prices by adding to buying prices 10% to cover losses, together with a margin of 40%. Other supermarket chains reportedly mark up shrimp by 25-75%. Fish shops have margins of 20-60%.

**Substitute Products.** Consumption of surimi-based substitute products has increased dramatically in recent years. Declining catches of king crab pushed the price of crabmeat to record levels, with the result that many customers have replaced it with cheaper crab species or substitute products. The substitute products, which sell for much less than the price of king crabmeat, have achieved considerable penetration of the market.

Substitutes for shrimp, on the other hand, have so far had little success. The taste and texture of the shrimp substitutes are still not close enough to the natural product. Furthermore, the price differential between natural shrimp and its substitutes is much less than for crabmeat. Since both the manufacturing technology and the development of the market for shrimp substitutes are in the early stages, it is not possible to predict the eventual position that these products will have in the market. The shrimp industry appears to be unworried by competition from substitute products.



## Trends

**Supply.** World catches by fishing boats are thought to be close to their upper limits, since most major shrimp fisheries are presently being harvested to full, or nearly full, capacity. Capture fisheries cannot be expected to yield any substantial increases. The production of cultured shrimp, especially in Latin America and the Indo-Pacific region, has shown rapid growth in recent years. Over 80% of the total supply of shrimp in the US market in 2000 was from foreign sources and in 2004 this had risen to 93%. Landings by domestic fishing vessels are expected to continue at about their past levels. US domestic catches of tropical shrimp are believed to have reached maximum production levels. Catches of coldwater shrimp declined sharply after reaching a peak in 1977, but have recently shown some signs of recovery.

Total supply from domestic sources will fluctuate from year to year, but cannot be expected to yield any substantial increases. The balance required must continue to come from imports. Boat catches of shrimp in the Asian and Latin American countries, which traditionally provided the major part of exports to the US, have stabilized. Aquaculture is seen as the principal source of growth of production to satisfy additional demand in the US market. Despite the expansion of advanced technology, significant fluctuations in supplies of cultured shrimp occur for environmental, economic and political reasons. Experience has shown that the production of cultured shrimp can vary widely from year to year.

Black Tiger shrimp (*P. monodon*) are caught in the wild by fishing vessels off most of the coastal countries of the Indian Ocean and SE Asia. They generally account for only a small part of the total catches of shrimp. It is, however, the species most commonly cultured in producing countries in Asia, with the exception of China, although increasing quantities of the white shrimp (*P. vannamei*) are also being cultured.

Consequently, the major part of the increase in cultured production can be expected to be Black Tiger shrimp and white shrimp from countries such as Thailand, China, Indonesia, Philippines, India, Bangladesh and others. A smaller part of the increase will likely be white species, from Latin America (*P. vannamei*).

The degree to which producing countries will be competitive depends not only on the cost of production, but also on the income generated as a result of the species, sizes and quantities produced.

In a period of rising world production, real prices nevertheless increased by about 3 times between 1950 and 1980. Since 1980 prices of most sizes of shrimp have trended downwards in real terms, especially those sizes produced by shrimp farmers. The increasing production of cultured shrimp is a key factor in current price trends and further price declines should be expected in the sizes produced from culture operations. It should be noted that the prices paid for any given size will vary in accordance with the value the markets place on different species and the reputation of the producing countries in so far as product quality is concerned.

Data on production costs are not readily available, since most producers consider this proprietary information. Shrimp farmers in Latin America are thought to produce shrimp more cheaply than capture fisheries. The principal operating costs for shrimp culture are feed, followed by post-larvae, fuel and labour, but these vary according to the level of technology employed. For the owner of a shrimp boat the major operating expenses are fuel and labour.

For both farmers and fishermen the cost of construction and financing of capital assets is also of major importance.

A limiting factor for cultured shrimp is the range of sizes produced. The best economic return with current technology in use in Central and South America is obtained by growing the white shrimp (*P. vannamei*) to sizes from 21-25 to 41-50 count per lb with a high percentage of 31-35 and 36-40 count shrimp. Cultured shrimp has been well accepted in its penetration of the US market. This product is normally packed and frozen within a few hours of harvesting, which tends to ensure that the quality is excellent.

Boat catches of shrimp in the Indo-Pacific region are thought to have stabilized. Growth in shrimp culture can be expected to continue in China, Indonesia, the Philippines, Thailand and other countries. Japan will doubtless continue to be a primary market for production from this area. The extent to which Indo-Pacific exporters will ship to the US and EU markets will depend chiefly on the ability of the Japanese market to absorb the increasing quantities available.

Differences in prices between sizes vary greatly and fluctuate according to the supply of and demand for each size. In order to harvest their shrimp at the size and moment in time which give the greatest return, farmers need to monitor constantly the relationship of sizes, market prices and production costs. They compare the time required to let the shrimp grow to a given size and the cost so incurred against the expected revenue.

Fluctuations in supply occur in relation to the seasonal availability of shrimp caught by fishing boats. Cultured shrimp, which can be grown all year round in tropical countries, tends to provide a more even flow into the market.

### ***Trade Disputes***

Shrimp fishermen in USA find themselves beset by rising costs. Shrimp prices have generally not increased sufficiently to compensate for increased costs. Since the fishery for tropical shrimp has shown no growth in recent years, it has not been possible for boat owners to reduce their cost per pound of shrimp by a greater catch per unit of effort. Gulf of Mexico and South Atlantic shrimp boat owners have twice before petitioned the US government, unsuccessfully, for relief as a consequence of competition from imported shrimp.

However, at the end of December 2003, the United States Department of Commerce (USDC), at the request of shrimp fishermen in the southeastern United States, initiated a dumping action against shrimp from China, Vietnam, Thailand, India, Ecuador and Brazil.

These six countries accounted for more than two-thirds of US imports of shrimp, mostly cultured. The surge in imports has lowered shrimp prices across the board, by 50 percent in some cases. The US shrimp fishermen say the six countries are selling shrimp at a higher price in their home markets than they are in the export market to the USA. However, it is the view of some industry sources that, even although they have managed to get tariffs imposed, the shrimp fishermen face total collapse if they don't learn to compete in the new world of lower shrimp prices. The shrimp exporting countries, supported by US shrimp importers, say shrimp prices are low because shrimp farmers have learned to produce shrimp for less than it costs the fishermen to catch them.

The Preliminary Determinations of the USDC in July 2004 supported the fishermen's position. Brazil and China were hit with heavy duties; Thailand and Ecuador, with relatively light duties. The International Trade Administration held hearings on the Final Determinations and rendered a final assessment of duties in 2005.

More serious than the duties has been a new Customs bond required by the USA. US Customs adopted a bond rule, requiring higher bonds, amounting to full collateral for the punitive dumping tariffs. The rule applies across the board to imports of all agriculture or aquaculture products liable to anti-dumping duties. To comply with the rule, an importer of, for example, Thai shrimp was required to post a bond to the value of the previous financial year's imports multiplied by 5.95%, the rate of the anti-dumping duty. The bonds are valid for a year, but cannot be redeemed until after three years, creating a situation where companies need to have two or three bonds running concurrently, which few can afford.

### ***Demand***

Since it is estimated that in USA over two-thirds of all shrimp is consumed away from home, a key determinant of demand is the availability of disposable personal income. The consumer considers shrimp an item to be eaten principally when entertaining or dining out, whereas at home preference is given to less expensive food.

Thus, when a slow-down in the economy reduces disposable personal income, demand for shrimp is dampened. When economic conditions improve, an increased level of disposable personal income encourages consumers to eat out more often and demand for shrimp becomes stronger.

Since, in the production of farmed shrimp, sizes and the timing of harvests can be predicted with a fair degree of accuracy, production may be programmed to meet customers' planned future requirements. It is envisaged that new segments of the market can be developed as a result of the farmers' ability to ensure continuity of supply of the sizes required.

To meet increases in demand, additional supplies must be found and can be expected to come from imports, chiefly of cultured shrimp. Fluctuations in supply will undoubtedly continue to occur. When there is a shortage prices will rise, which will encourage new capital to enter the industry. Periods of oversupply will drive prices down and cause demand to increase until the market has absorbed the excess.

The US market presents the likelihood of increases in demand, as a result of growth in population and rising levels of personal disposable income. The principal increases in the supply needed to meet this growth are expected to come from aquaculture producers in Asia.

### ***Prices***

The three major markets are in the process of adjusting to increased supplies of cultured shrimp. Total imports into these markets have been running at record levels. The markets have been able to absorb the increased supplies, but prices have declined. Other factors which affect prices include the cost of production of both boat and farm operations; relative exchange rates; trends in disposable personal income; population growth; and the price of competing products.

The total supply of shrimp is expected to show growth, probably at a rate which will tend to hold down or depress prices. There will be the usual cyclical price fluctuations, with an overall trend showing little or no increase in real prices.

### **Regulatory Considerations**

The quality of seafood, as it relates to consumer safety, has become a major issue in USA. Increased interest from the media and from consumers precipitated a demand for legislation to create a mandatory seafood inspection program. This resulted in the promulgation of the USDA Seafood Hazard Analysis Critical Control Point (HACCP) regulation, which went into effect in 1997. While the program was aimed principally at domestic producers and processors of fisheries products, it requires that imports must meet the same standards as those affecting domestic fish products.

### **Quality**

There is increased concern at the use, in the production of shrimp, of drugs which have been banned in the market countries. One of these is *chloramphenicol*, which is a “broad spectrum antibiotic used for treating typhoid and other infections in humans. However, it is considered a drug of last resort, due to toxic effects, such as aplastic anemia, which can develop in susceptible individuals” (Global Aquaculture Advocate, February 2002). Another drug, which has reportedly been found in shrimp, is *nitrofurans* which has been banned for use in food producing animals on account of the risk that it may cause cancer in humans. Market countries, including the EU, the US and Canada, are increasingly testing imported shrimp, especially from Asia.

### **Environmental Issues**

“The turtle excluder device (TED) is a grid of bars with an opening either at the top or the bottom. The grid is fitted into the neck of a shrimp trawl. Small animals, like shrimp, slip through the bars and are caught in the bag at the end of the trawl. Large animals, such as turtles and sharks, when caught at the mouth of the trawl, strike the grid bars and are ejected through the opening” (Office of Protected Resources, NMFS, NOAA). NMFS claims that TEDs are effective in excluding up to 97 percent of sea turtles with minimal loss of shrimp (although shrimp fishermen might not agree that the loss of shrimp is minimal).

The US government requires shrimp fishing vessels of other countries to use TEDs if those countries wish to export shrimp to the US. Some countries are of the opinion that this is an inappropriate restraint of trade and have raised a dispute at the World Trade Organization (WTO).

### **Process Certification**

The Responsible Aquaculture Programme (RAP) of the Global Aquaculture Alliance (GAA) (<http://www.gaalliance.org/resp.htm>) is under development and will “certify the process of sustainable aquaculture in farms throughout the world”. This is “a buyer-oriented program”, for which GAA is “working to build support... within national producer associations and the international shrimp-buying community”. The RAP will “guide participating farms toward clearly defined food safety, environmental and social goals”.

## Considerations in Approaching the US Market

### ***Options for Entry***

Overseas exporters wishing to ship to the US market may sell outright to importers; may ship their merchandise under a consignment arrangement; may make sales through an agent; or may choose to sell directly to processors, restaurant chains, wholesale distributors or supermarket chains.

The majority of overseas exporters shipping to the USA sell directly to importers with payment for the full invoice value by means of irrevocable letters of credit or telegraphic transfers. Prices are negotiated before each shipment. Importers frequently require the payment be subject to passage of USFDA.

Under consignment arrangements, importers act as agents for overseas exporters. Advances of 60-80% of the estimated value of the merchandise are made by importers by means of letters of credit with payment against presentation of shipping documents or after passage of USFDA. The remainder of the price is remitted to the exporters after the goods have been sold in USA and after the importers have deducted direct costs and the importers' commission from the proceeds. There are no standard commission rates. Commission rates vary between 3% and 7%, depending on which charges are to be absorbed by the importers, the volume of shipments and the reputation of the exporters' brands in the US market.

In the case of outright purchase, importers assume the risk that the market may go up or down from the moment at which prices are agreed. Under a consignment arrangement the overseas exporters assume the market risk until such time as the goods are sold in the USA by the importers.

Overseas exporters, under a consignment arrangement, achieve greater penetration of the market, since they sell to the importers' customers, as opposed to selling to importers under an outright purchase. In a rising market exporters may obtain a better return selling under consignment, but in a falling market may make less than by selling outright.

In other cases, sales are made by agents in the exporting country or in the USA, to customers who open letters of credit directly in favour of overseas exporters. The commissions earned by such agents are normally 1% to 2% and may be paid by either buyers or sellers.

Most of the processors, restaurant chains, wholesale-distributors and supermarket chains customarily buy their supplies of shrimp within USA, since they are not normally set up to deal with overseas exporters, to open letters of credit or to assume the risks of quality and price fluctuations. When they do decide to buy directly overseas, they assume the functions of importers and expect to trade on an equal basis with the importers. Nevertheless, certain advantages may be obtained by producers of cultured shrimp in dealing directly with such buyers.

In the production of cultured shrimp, sizes and the timing of harvests may be predicted with a fair degree of accuracy. Consequently, in some cases, production may be programmed to meet customers' planned future requirements. Continuity of supply of the sizes required, and the assurance of excellent quality, make it possible to undertake direct marketing of shrimp

under a program linking overseas producers with qualified users in the US market, such as processors, restaurant chains and supermarket chains.

By marketing directly from producers to users, certain links in the marketing chain will become redundant. Exporters may be able to negotiate higher prices as a result of the savings obtained. Before launching an exporter into a program of this type, it is essential that the company develop a reputation in the US market for shrimp of consistently good quality, accurate weights and counts, and uniformity of color and size. A direct marketing program of the type envisaged is best undertaken by integrated operations in the producing country, in which overseas exporters have their own shrimp ponds as well as their own processing facilities.

Forward commitments to supply users with their needs are the essence of a direct marketing program. It is recommended that exporters should not commit to such a program more than a portion of their total production.

### ***Investment in the United States***

Exporters may wish to consider an investment in marketing, processing, or cold storage facilities in USA. Importers have, at times, suffered substantial losses as a result of bankruptcies amongst the processors, wholesalers, and distributors who are their customers. The minimum requirement for the operation of an importing company in the US would be a manager/salesman and a receptionist/clerk/stenographer. The annual overhead of such a company would be approximately as follows:

#### *Estimated Annual Overhead of US Shrimp Importer(US\$)*

Manager/salesman	100,000
Receptionist/clerk/stenographer	30,000
Office rent, electricity, supplies, telephone, telefax, travel expenses and others	70,000
Total	200,000

With a gross margin of 3% (of which about 1% would go to cover the expenses described above) an importing company would not break even on sales of less than US \$20.0 million. It should be noted that no allowance has been made for bad debts in calculating the break-even point.

An importing company will require a line of credit in order to be able to open letters of credit and finance sales and accounts receivable. The amount of equity needed to enable the required line of credit to be obtained from a bank will depend on the bank's evaluation of the experience and success of the importing company in trading shrimp.

An importing company buying shrimp in Latin America probably turns its inventory on average about once per month. Initially, at least, a new importing company might not be able to obtain lines of credit of more than 2 times equity. With these assumptions the return on equity, with no provision for bad debts, would be about 25%:

#### *Shrimp Importer – Return on Equity*

Annual sales	100
Line of credit (annual sales: number of inventory turns/year)	8
Equity (line of credit: 2)	4

Profit, after tax	1
Return on equity (after tax profit: equity)	25%

U.S. processors use mainly headless shell-on shrimp, which they convert to a range of products, which includes breaded, peeled, canned and specialty items, both raw and cooked. In this highly competitive segment of the seafood industry, profitability depends on the cost of raw material. Breaded shrimp production has grown little for many years. The production of canned shrimp has declined. Statistical information on the production of cooked shrimp is not available, but industry sources estimate that there has been a trend toward increased production of cooked shrimp in recent years. That a number of shrimp processors have gone out of business indicates that profits have been inadequate.

Since there are companies which assume more than one of the respective functions, the distinction between importers, wholesalers and distributors is not always clear. Wholesalers normally have their own cold-storage warehouses, where shipments are received and broken down into small lots. Most wholesalers deal in a range of other products in addition to shrimp. Distributors deliver with their own trucks to restaurants and retail outlets, also frequently to individual units of restaurant and supermarket chains, a range of products, which includes shrimp.

The seafood industry in USA is served in all major concentrations of population by privately-owned cold-storage companies. These units are known as public cold-stores, since access is open to anyone who wants to use them. Handling and storage rates are usually regulated by public service commissions in each state. Most importers use public cold-storage as and where needed. Processors normally have their own cold-storage space attached to the processing plants to ensure a smooth flow of raw material and finished products, but also make use of public cold-stores. Wholesalers and distributors may use public cold-storage; may operate from a unit within a public cold-store; or may own their own storage facility.

In general, except under circumstances where insufficient public cold-storage is available at certain times of the year, the trade prefers to use public cold-storage. The advantages of using public cold-storage are that there is no investment in fixed assets; the service can be used as, where and when needed; and distribution is made easier, since trucking companies pick up from and deliver to the many users of such facilities.

In considering the possibility of investing in marketing, processing or cold-storage facilities in USA, an exporter may wish to consider the possibility of buying into an existing business. A serious and reliable US company would be unlikely to have interest in such an investment unless it brought with it a commitment to supply needed products in volume. The advantage to an exporter would be that it could expect to receive preferential treatment from its partner as a buyer. On the other hand, it would be limiting its marketing effort to only one outlet, so that results would be related directly to the US partner's ability in the marketplace.

### ***Products with Added Value***

The dominant form of product in the US market is headless shell-on shrimp. This is processed into a variety of peeled, breaded, and other products by specialized processing plants and by restaurants. Processing operations in USA are being adversely affected by the high cost of labour. Consequently processors in some cases buy peeled shrimp from countries where the

labour cost is lower. For breeding this is generally peeled shrimp with the tail fan and last segment in place. It should be noted that shrimp is often peeled in exporting countries, not with the object of adding value, but as a means to salvage product which, because of some minor damage, would not be suitable for export in headless shell-on or whole head-on form.

The production of raw breaded shrimp overseas has shown some recent growth, but is not significant in volume. Difficulties in control of the quality of the finished goods and in transportation of a fragile product, combined with vested interests in shrimp breeding plants in the US, have made the breeding of shrimp overseas an undertaking which has met with little success. Furthermore, although breaded shrimp is still an important factor in the US market, it has shown relatively little growth in volume for many years.

There has been some growth in imports of cooked shrimp into the US market, but it still accounts for a relatively small share of total imports. A constraint to growth has been the fact that products which require no further cooking and so are ready to eat, as is the case with cooked shrimp, are considered to expose consumers to the risk of illness from *Listeria monocytogenes*.

The advantage of marketing shrimp, in whatever product form, as individually quick frozen (IQF) product is that it can be removed from its container in whatever quantities are required, without the need to thaw the product. Such product is normally packed in bulk, however, which makes it liable to lose its protective glaze during handling and so become more susceptible to freezer burn; the tail fans and other appendages become brittle and are easily broken; since the product is loose inside, master cartons are difficult to stack and tend to get damaged; and fluctuations in temperatures during handling and storage can cause individual shrimp to stick together.

Although there are times when the market may pay a premium for peeled, IQF, cooked or other products with added value, this is not always so. There are no fixed differentials which give an advantage in price to products with added value in relation to the standard forms. Each product form and size must be considered a separate market, subject to the forces of supply and demand.

Overseas exporters, capable of producing shrimp with added value, not infrequently find that there are periods when the relationship of prices between the standard products, typically headless shell-on shrimp, and products with added value is such that it is more profitable for them to pack the standard products.

It is generally true to say that the standard shrimp products can always be sold, at whatever the market prices may be at the time, in the US market, provided that they are of good quality. Headless shell-on shrimp are exposed to less handling than other product forms and so are less prone to contamination. Consequently, a new exporter is best advised to start production with raw headless shell-on products. Consideration should not be given to the export of products with added value until such time as the exporter has established credibility with US government authorities, in particular with USFDA, and with the trade in USA, with headless shell-on products.

Product diversification is desirable, but great care is needed to ensure that products with added value are prepared to the standards of the market. Furthermore, once production of



such products has started, arrangements should be such that it is impossible for buyers to back out. Since products with added value are normally produced to meet the specific requirements of a buyer, an overseas exporter is best advised not to buy special equipment or start production until technical specifications and procedures have been clearly defined in writing and irrevocable orders for the product have been placed. It should be noted that such products are generally made to order and so may be difficult or impossible to sell if rejected or refused by the buyer who ordered them or by the governmental authorities in the USA.

### **Quality**

As world production continues to increase, shrimp exporters must expect to face a highly competitive market. Quality will be increasingly important in what is expected to be generally a buyers' market. The single most important characteristic of any producer of shrimp is a name for consistent good quality. Exporters must make every effort to ensure that the product is fresh and uncontaminated, that counts are accurate and weights correct and that there is uniformity of size and color. New exporters of shrimp must expect to be considered as being on trial with both the government inspection service and the trade in USA. USFDA normally inspects shipments, as they enter USA, infrequently and at random. Where overseas exporters have no previous record, USFDA will generally draw samples from 5 consecutive shipments, all of which must be approved, before putting the exporters on the list requiring only infrequent inspections. Exporters wishing to ship to the USA must implement a HACCP program.

### **Websites**

Information on import regulations and procedures can be found at the following web sites:

[www.fda.gov/ora/import/ora\\_import\\_program.html](http://www.fda.gov/ora/import/ora_import_program.html)

[www.customs.ustreas.gov/](http://www.customs.ustreas.gov/)

## **EUROPEAN MARKET**

### **Supplies**

Coldwater shrimp, which is supplied chiefly by countries in the north Atlantic, is a major factor in the European market. Domestic catches of the European Community (EC) include brown shrimp (*Crangon crangon*), a small coldwater species, which declined from 27,300 metric tons in 1985 to 15,600 metric tons in 1990, but then recovered to 33,500 metric tons in 2000 and 40,400 metric tons in 2006. More important, however, are the deepwater pink shrimp (*Panadalus borealis*), which is caught by vessels from Europe and other north Atlantic countries, including Canada. Annual catches of this species fluctuated at about 200,000 metric tons in the period 1985-90, since when they increased to reach a peak of 447,600 metric tons in 2004, after which they declined to 388,600 metric tons in 2006.

Imports of shrimp into European countries (EU-25) increased from 501,000 metric tons in 1999 by 69% to 846,000 metric tons in 2007. In 2007 the country importing the greatest volume was Spain (179,000 metric tons), followed by Denmark (131,000 metric tons) and France (109,000 metric tons).

The leading suppliers to the European market in 2007 were Ecuador (62,900 metric tons), Greenland (56,100 metric tons), India (49,100 metric tons), Argentina (45,300 metric tons) and China (37,300 metric tons).

The increases in imports have been at least partially the result of the strength of the European currencies in relation to the US dollar, as well as the slow growth in the supply of the coldwater species.

Trade among the member countries of the EC is duty free. Exceptions are made for countries which have recently joined the EC, which have been granted transitional arrangements.

Access from outside the EC, and the tariff rates charged on imported shrimp, vary according to a number of trade agreements, the degree of development of the exporting countries and the species and processing of the shrimp. Although there is a common external tariff in regard to import duties, there are important differences between member countries in respect to import and quality regulations, which it is intended to harmonize in the future.

It should be noted that most products exported by African, Caribbean and Pacific (ACP) states, signatories to the Lome Convention, as well as by overseas countries and territories associated with the EC, were granted duty-free access. New arrangements have replaced this type of preferential access.

## **Consumption**

European countries can be broadly divided into two groups in respect to shrimp consumption. Northern European countries prefer coldwater species. The Mediterranean countries prefer warm-water shrimp, generally in whole head-on form.

In 1988 per capita consumption was 0.75 kg, lower than both Japan and USA. However, there are wide differences between individual countries, with per capita consumption in Spain normally substantially higher than in most other European countries.

The share of tropical shrimp in EC consumption was reportedly 60% in 1988. Since catches of coldwater species by European and north Atlantic countries are considered to be at maximum levels, increases in supply to this market can be expected to come from tropical species. Since capture fisheries for tropical shrimp are also believed to be at maximum production levels, additional supplies will probably be provided by shrimp farmers, principally in Asia and Latin America.

The share of shrimp consumed away from home has generally been less in European countries than in Japan and USA.

## **Principal Market Countries**

Due to limited domestic production, most consumption in Belgium is supplied by imported shrimp. Belgian importers buy shrimp from many countries, some of which is re-exported to other European countries. However, the principal supplying country is Netherlands, chiefly with C&P products. .

Domestic production in France is very small. Imports have expanded rapidly. French importers have traditionally purchased much of their requirements from West Africa, but

heavy competition from Asian producers, especially in C&P shrimp, has caused West African exporters to lose their predominant position.

An appreciable share of consumption in Germany is from domestic production of coldwater shrimp. Since coldwater species are also imported, tropical shrimp accounts for only a small share of total supply to this market.

Domestic shrimp landings in Italy accounted for about one quarter of total apparent supply to this market in 2006. Coldwater and tropical shrimp are imported.

Industry sources have estimated that the annual consumption of shrimp in the Netherlands is mostly domestic production of coldwater species. The Dutch processing industry uses raw material imported from many countries, with the finished products mostly re-exported, principally to Belgium and Germany.

Domestic production, mostly of warm water species, has declined in Spain. Imports increased from 59,300 metric tons in 1990 by 202% to 178,800 metric tons in 2007. Annual per capita supply to the Spanish market is normally the highest in the EC.

Domestic production in the U K is very limited. Imports of coldwater and tropical shrimp increased by 16% in the period 2000-2007.

## Trade Access

The classification of countries exporting to the EU is governed by the following regulations:

Third (non-E.U.) countries are classified into two categories. Particular account is taken of the third country legislation; of the organization and powers of the third country competent authority and inspection services; the actual health conditions.

Countries (+ Norway and Iceland as members of the European Economic Area) included in List 1 are "harmonized" or "approved" countries. It means that their legislation requirements are at least equivalent to those governing the E.U. domestic production, and that an E.U. inspection team has audited the competent authority, which satisfied E.U. requirements. A specific decision has been adopted for each of those countries fixing specific import conditions, including the official recognition of the competent authority, a specific model of health certificate and a list of approved establishments.

List 2 includes third countries that gave, at least on paper, enough guarantees concerning their inspection system and their legal sanitary requirements. But those countries have not yet been visited by an E.U. team of inspectors to audit the competent authority. After that date, imports from non-approved countries will be banned. This list of countries, of which the United States is one, constitutes the so-called "pre-listed" or "pre-harmonized" group. Products imported from those countries may be subject to additional national legislation. Some Member States may request lists of approved establishments. A list may be fully accepted by one Member State, and partially rejected by another one. The US is one of the countries scheduled to be part of list 1 by the end of 2003.

All other countries not mentioned in either List 1 or 2 cannot export any fish and fishery products to the European Union. If a third country, not listed in List 1 or 2, wants to export fish and fishery products to the E.U., it has first to contact the European Commission to provide information on its legal system concerning

controls on seafood establishments. Discussions and negotiations may lead to an official visit of the country by a team of E.U. inspectors that will propose to approve or not that country.

## **Import Regulations and Procedures**

Information on import regulations and procedures can be found at [www.nmfs.noaa.gov/trade](http://www.nmfs.noaa.gov/trade) (go to Import Requirements, then to How to Export Seafood to EU).

## **Regulatory Trends**

The EU HACCP measure for fishery products (excluding bivalves, and residue monitoring programme requirements for aquaculture products) is Council Directive 91/493/EEC of 22 July 1991 laying down the health conditions for the production and the placing on the market of fishery products. If the shrimp is farmed, then drug registration, residue controls and monitoring should also be in place (Regulation 2377/1990 and Directive 93/1996, respectively).

## ***Traceability***

Traceability requirements are specified in Council Regulation 178/2002, which apply to third countries from 2006.

## ***Certification***

There are various certification schemes (such as MSC, environmental, organic and others), which suppliers can buy into or customers can ask for. It is the view of one European authority that the application of such schemes is, so far, not common and has probably not reached even a small percentage of the trade in fish and fisheries products. It is not yet clear what benefits those certified will receive, so that there is doubt that the benefits received by certified suppliers as a result of certification will be greater than the costs they incur to obtain certification.

# Appendix D. Prices of Shrimp in the United States, 2004- 2008

## Headless Shell-on Pond-raised White Shrimp from Central and South America, 2004-2009

### 2004

(US dollars/lb, ex-warehouse New York)

Count/lb	29 Jan	26 Feb	30 Mar	29 Apr	27 May	29 Jun
16-20	6.00-6.10	6.00-6.10	6.20-6.40	6.25-6.50	6.15-6.25	6.15-6.25
21-25	4.70-4.80	4.85-4.95	5.00-5.10	5.00-5.10	4.95-5.05	4.95-5.05
26-30	3.60-3.70	3.85-3.95	4.10-4.20	3.85-3.95	3.50-3.60	3.75-3.85
31-35	3.05-3.15	3.20-3.30	3.40-3.50	3.00-3.10	2.60-2.70	2.90-3.00
36-40	2.70-2.80	2.90-3.00	3.30-3.40	2.90-3.00	2.40-2.50	2.80-2.90
41-50	2.60-2.70	2.80-2.90	3.25-3.35	2.80-2.90	2.25-2.35	2.60-2.70
51-60	2.40-2.50	2.70-2.80	3.15-3.25	2.70-2.80	2.15-2.25	2.45-2.55
61-70	2.35-2.45	2.60-2.70	3.05-3.15	2.60-2.70	2.05-2.15	2.35-2.45
71-90	2.05-2.15	2.20-2.30	2.60-2.70	2.50-2.60	1.95-2.05	2.20-2.30

Count/lb	29 Jul	31 Aug	30 Sep	28 Oct	30 Nov	30 Dec
16-20	6.60-6.70	6.40-6.50	6.35-6.45	6.35-6.45	6.35-6.45	6.35-6.45
21-25	5.40-5.50	5.30-5.40	5.10-5.20	5.00-5.10	4.90-5.00	4.80-4.90
26-30	4.30-4.40	3.85-3.95	3.65-3.75	3.70-3.80	3.70-3.80	3.70-3.80
31-35	3.40-3.50	2.80-2.90	2.60-2.70	2.90-3.00	2.95-3.05	2.95-3.05
36-40	3.15-3.25	2.55-2.65	2.45-2.55	2.80-2.90	2.85-2.95	2.65-2.75
41-50	2.95-3.05	2.40-2.50	2.40-2.50	2.70-2.80	2.70-2.80	2.50-2.60
51-60	2.75-2.85	2.30-2.40	2.35-2.45	2.60-2.70	2.60-2.70	2.40-2.50
61-70	2.65-2.75	2.25-2.35	2.25-2.35	2.50-2.60	2.50-2.60	2.30-2.40
71-90	2.45-2.55	2.20-2.30	2.20-2.30	2.40-2.50	2.40-2.50	2.20-2.30

Source: Price Current, Urner-Barry; the last weekly price quoted each month.

2005

*(US dollars/lb, ex-warehouse New York)*

Count/lb	27 Jan	24 Feb	31 Mar	28 Apr	31 May	30 Jun
16-20	6.40-6.50					
21-25	4.80-4.90	4.80-4.90	4.80-4.90	4.60-4.70	4.60-4.70	4.60-4.70
26-30	3.80-3.90	3.85-3.95	3.85-3.95	3.80-3.90	3.80-3.90	4.10-4.20
31-35	3.35-3.45	3.55-3.65	3.75-3.85	3.60-3.70	3.55-3.65	3.70-3.80
36-40	3.00-3.10	3.15-3.25	3.25-3.35	3.05-3.15	3.00-3.10	3.20-3.30
41-50	2.70-2.80	2.75-2.85	2.75-2.85	2.60-2.70	2.60-2.70	2.95-3.05
51-60	2.50-2.60	2.60-2.70	2.60-2.70	2.45-2.55	2.45-2.55	2.70-2.80
61-70	2.40-2.50	2.50-2.60	2.50-2.60	2.35-2.45	2.35-2.45	2.60-2.70
71-90	2.35-2.45	2.40-2.50	2.40-2.50	2.20-2.30	2.20-2.30	2.40-2.50

Count/lb	28 Jul	30 Aug	29 Sep	27 Oct	29 Nov	29 Dec
16-20					6.10-6.20	6.10-6.20
21-25	4.60-4.70	4.60-4.70	4.60-4.70	4.60-4.70	4.50-4.60	4.30-4.40
26-30	4.30-4.40	4.30-4.40	4.25-4.35	4.15-4.25	4.15-4.25	4.00-4.10
31-35	3.75-3.85	3.65-3.75	3.55-3.65	3.45-3.55	3.45-3.55	3.45-3.55
36-40	3.20-3.30	3.05-3.15	3.05-3.15	2.95-3.05	2.90-3.00	2.90-3.00
41-50	2.95-3.05	2.75-2.85	2.80-2.90	2.80-2.90	2.75-2.85	2.70-2.80
51-60	2.80-2.90	2.65-2.75	2.75-2.85	2.70-2.80	2.70-2.80	2.60-2.70
61-70	2.55-2.65	2.55-2.65	2.65-2.75	2.60-2.70	2.60-2.70	2.50-2.60
71-90	1.95-2.05	2.45-2.55	2.55-2.65	2.50-2.60	2.45-2.55	2.40-2.50
91-110		1.90-2.00	1.90-2.00	2.00-2.10	2.00-2.10	2.05-2.15

Source: Price Current, Urner-Barry; the last weekly price quoted each month.

2006

(US dollars/lb, ex-warehouse New York)

Count/lb	31 Jan	28 Feb	30 Mar	27 Apr	30 May	29 Jun
16-20	6.10-6.20	6.10-6.20	6.10-6.20	6.10-6.20	6.10-6.20	6.10-6.20
21-25	4.30-4.40	4.35-4.45	4.35-4.45	4.35-4.45	4.40-4.50	4.55-4.65
26-30	4.00-4.10	4.00-4.10	4.00-4.10	3.90-4.00	3.80-3.90	4.00-4.10
31-35	3.45-3.55	3.45-3.55	3.35-3.45	3.35-3.45	3.20-3.30	3.25-3.35
36-40	3.05-3.15	3.10-3.20	3.10-3.20	3.05-3.15	2.90-3.00	3.00-3.10
41-50	2.80-2.90	2.85-2.95	2.95-3.05	2.90-3.00	2.75-2.85	2.85-2.95
51-60	2.65-2.75	2.65-2.75	2.75-2.85	2.80-2.90	2.65-2.75	2.70-2.80
61-70	2.55-2.65	2.55-2.65	2.65-2.75	2.70-2.80	2.55-2.65	2.60-2.70
71-90	2.40-2.50	2.40-2.50	2.55-2.65	2.60-2.70	2.40-2.50	2.50-2.60
91-110	2.05-2.15	2.05-2.15	2.15-2.25	2.15-2.25	2.05-2.15	2.20-2.30
111-130	1.70-1.80	1.70-1.80	1.70-1.80	1.70-1.80	1.70-1.80	1.70-1.80

Count/lb	27 Jul	31 Aug	28 Sep	31 Oct	30 Nov	28 Dec
16-20				5.45-5.55	5.25-5.35	5.15-5.25
21-25	4.85-4.95	4.90-5.00	4.90-5.00	4.55-4.65	4.35-4.45	4.20-4.30
26-30	4.10-4.20	4.10-4.20	3.85-3.95	3.70-3.80	3.65-3.75	3.70-3.80
31-35	3.30-3.40	3.20-3.30	3.10-3.20	3.00-3.10	3.00-3.10	3.05-3.15
36-40	3.05-3.15	3.00-3.10	2.95-3.05	2.75-2.85	2.75-2.85	2.75-2.85
41-50	2.85-2.95	2.75-2.85	2.70-2.80	2.60-2.70	2.55-2.65	2.55-2.65
51-60	2.70-2.80	2.60-2.70	2.60-2.70	2.55-2.65	2.50-2.60	2.50-2.60
61-70	2.60-2.70	2.55-2.65	2.55-2.65	2.50-2.60	2.45-2.55	2.45-2.55
71-90	2.50-2.60	2.45-2.55	2.40-2.50	2.35-2.45	2.30-2.40	2.30-2.40
91-110	2.20-2.30	2.20-2.30	2.20-2.30	2.05-2.15	2.05-2.15	2.05-2.15
111-130	1.70-1.80	1.70-1.80	1.70-1.80	1.70-1.80	1.70-1.80	1.70-1.80

Source: Price Current, Urner-Barry; the last weekly price quoted each month.

2007

(US dollars/lb, ex-warehouse New York)

Count/lb	30 Jan	27 Feb	29 Mar	26 Apr	31 May	28 Jun
16-20	5.05-5.15	4.95-5.05	4.90-5.00	4.85-4.95	4.90-5.00	5.05-5.15
21-25	4.20-4.30	4.10-4.20	4.05-4.15	3.95-4.05	4.00-4.10	4.20-4.30
26-30	3.70-3.80	3.80-3.90	3.80-3.90	3.80-3.90	3.80-3.90	3.85-3.95
31-35	3.15-3.25	3.20-3.30	3.20-3.30	3.20-3.30	3.20-3.30	3.20-3.30
36-40	2.85-2.95	2.90-3.00	2.85-2.95	2.85-2.95	2.80-2.90	2.80-2.90
41-50	2.55-2.65	2.50-2.55	2.45-2.50	2.40-2.50	2.50-2.60	2.65-2.75
51-60	2.50-2.60	2.40-2.45	2.30-2.40	2/30-2.40	2.30-2.40	2.35-2.45
61-70	2.45-2.55	2.30-2.35	2.20-2.30	2.20-2.30	2.15-2.25	2.20-2.30
71-90	2.30-2.40	2.20-2.30	2.10-2.20	2.05-2.15	1.95-2.05	2.00-2.10
91-110	2.05-2.15	2.00-2.10	2.00-2.05	1.95-2.05	1.85-1.95	1.90-2.00
111-130	1.70-1.80	1.70-1.80	1.70-1.80	1.70-1.80	1.70-1.80	1.65-1.75

Count/lb	31 Jul	30 Aug	27 Sep	30 Oct	29 Nov	31 Dec
16-20				5.45-5.55	5.95-6.05	6.30-6.40
21-25	4.45-4.55	4.45-4.55	4.35-4.45	4.20-4.30	4.45-4.55	4.60-4.70
26-30	4.15-4.25	4.15-4.25	4.05-4.15	3.85-3.95	3.95-4.05	3.95-4.05
31-35	3.35-3.45	3.30-3.40	3.25-3.35	3.10-3.20	3.20-3.30	3.30-3.40
36-40	3.00-3.10	2.95-3.05	2.85-2.95	2.80-2.90	2.90-3.00	3.00-3.10
41-50	2.85-2.95	2.85-2.95	2.70-2.80	2.65-2.75	2.80-2.90	2.85-2.95
51-60	2.50-2.60	2.50-2.60	2.50-2.60	2.50-2.60	2.70-2.80	2.75-2.85
61-70	2.40-2.50	2.40-2.50	2.40-2.50	2.45-2.55	2.65-2.75	2.70-2.80
71-90	2.20-2.30	2.20-2.30	2.15-2.25	2.15-2.25	2.25-2.35	2.30-2.40
91-110	2.00-2.10	1.95-2.05	1.95-2.05	1.95-2.05	2.00-2.10	2.00-2.10
111-130	1.65-1.75	1.65-1.75	1.65-1.75	1.65-1.75	1.65-1.75	1.65-1.75

Source: Price Current, Urner-Barry; the last weekly price quoted each month.



2008

*(US dollars/lb, ex-warehouse New York)*

Count/lb	31 Jan	28 Feb	27 Mar	29 Apr	29 May	26 Jun
16-20	6.75-6.85	6.85-6.95	6.85-6.95	6.85-6.95	6.85-6.95	
21-25	4.80-4.90	4.80-4.90	4.85-4.95	4.90-5.00	5.00-5.10	5.00-5.10
26-30	3.95-4.05	3.95-4.05	3.85-3.95	3.70-3.80	3.75-3.85	3.75-3.85
31-35	3.30-3.40	3.30-3.40	3.30-3.40	3.25-3.35	3.30-3.40	3.40-3.50
36-40	2.95-3.05	2.90-3.00	3.00-3.05	3.00-3.10	3.15-3.25	3.35-3.45
41-50	2.80-2.90	2.75-2.85	2.80-2.90	2.85-2.95	3.10-3.20	3.30-3.40
51-60	2.70-2.80	2.70-2.80	2.70-2.80	2.75-2.85	3.00-3.10	3.20-3.30
61-70	2.65-2.75	2.65-2.75	2.60-2.75	2.70-2.80	2.95-3.05	3.15-3.25
71-90	2.30-2.40	2.30-2.40	2.40-2.50	2.50-2.60	2.80-2.90	3.00-3.10
91-110	2.00-2.10	2.00-2.10	2.10-2.20	2.15-2.25	2.40-2.50	2.55-2.65
111-130	1.65-1.75	1.65-1.75	1.65-1.75	1.70-1.80	1.80-1.90	1.90-2.00

Count/lb	31 Jul	28 Aug	30 Sep	30 Oct	26 Nov	30 Dec
16-20					5.20-5.30	5.10-5.20
21-25	5.20-5.30	5.20-5.30	5.00-5.10	4.25-4.35	3.95-4.05	3.95-4.05
26-30	3.80-3.90	3.70-3.80	3.60-3.70	3.40-3.50	3.40-3.50	3.40-3.50
31-35	3.75-3.85	3.60-3.70	3.50-3.60	3.15-3.25	3.15-3.25	3.15-3.25
36-40	3.70-3.80	3.50-3.60	3.35-3.45	3.00-3.10	2.95-3.05	2.95-3.05
41-50	3.65-3.75	3.40-3.50	3.20-3.30	2.75-2.85	2.55-2.65	2.55-2.65
51-60	3.55-3.65	3.30-3.40	3.10-3.20	2.65-2.75	2.40-2.50	2.40-2.50
61-70	3.45-3.55	3.15-3.25	3.00-3.10	2.55-2.65	2.35-2.45	2.35-2.45
71-90	3.20-3.30	2.95-3.05	2.75-2.85	2.25-2.35	2.20-2.30	2.20-2.30
91-110	2.70-2.80	2.60-2.70	2.50-2.60	2.15-2.25	2.10-2.20	2.10-2.20
111-130						

*Source: Price Current, Urner-Barry; the last weekly price quoted each month.*

2009

*(US dollars/lb, ex-warehouse New York)*

Count/lb	29 Jan	26 Feb	31 Mar	30 Apr	28 May	30 Jun
16-20	4.95-5.05	4.85-4.95	4.65-4.75	4.25-4.35	4.25-4.35	4.15-4.25
21-25	3.95-4.05	3.95-4.05	3.95-4.05	3.80-3.90	3.75-3.85	3.90-4.00
26-30	3.60-3.70	3.65-3.75	3.65-3.75	3.55-3.65	3.50-3.60	3.70-3.80
31-35	3.20-3.30	3.20-3.30	3.15-3.25	3.05-3.15	3.00-3.10	3.15-3.25
36-40	2.90-3.00	2.90-3.00	2.85-2.95	2.80-2.90	2.70-2.80	2.90-3.00
41-50	2.55-2.65	2.55-2.65	2.55-2.65	2.55-2.65	2.55-2.65	2.80-2.90
51-60	2.40-2.50	2.40-2.50	2.40-2.50	2.40-2.50	2.40-2.50	2.55-2.65
61-70	2.35-2.45	2.35-2.45	2.35-2.45	2.30-2.40	2.30-2.40	2.45-2.55
71-90	2.20-2.30	2.20-2.30	2.20-2.30	2.20-2.30	2.20-2.30	2.30-2.40
91-110	2.10-2.20	2.10-2.20	2.10-2.20	2.10-2.20	2.10-2.20	2.10-2.20
111-130						

Count/lb	30 Jul	27 Aug	29 Sep			
16-20	4.15-4.25	4.15-4.25	4.15-4.25			
21-25	3.95-4.05	3.80-3.90	3.70-3.80			
26-30	3.75-3.85	3.70-3.80	3.50-3.60			
31-35	3.15-3.25	3.00-3.10	3.00-3.10			
36-40	3.00-3.10	2.80-2.90	2.65-2.75			
41-50	2.95-3.05	2.70-2.80	2.55-2.65			
51-60	2.60-2.70	2.45-2.55	2.45-2.55			
61-70	2.50-2.60	2.40-2.50	2.40-2.50			
71-90	2.35-2.45	2.25-2.35	2.25-2.35			
91-110	2.15-2.25	2.10-2.20	2.10-2.20			
111-130						

*Source: Price Current, Urner-Barry; the last weekly price quoted each month.*

## Head-on Pond-raised White Shrimp from Central and South America, 2004-2009

2004

(US dollars/lb, ex-warehouse New York)

Count/kg	29 Jan	26 Feb	30 Mar	29 Apr	27 May	29 Jun
30-40	3.60-3.70	3.60-3.70	3.70-3.80	3.60-3.70	3.30-3.40	3.40-3.50
40-50	2.50-2.60	2.50-2.60	2.80-2.90	2.75-2.85	2.35-2.45	2.40-2.50
50-60	2.25-2.35	2.35-2.45	2.65-2.75	2.50-2.60	2.15-2.25	2.15-2.25
60-70	2.10-2.20	2.20-2.30	2.40-2.50	2.40-2.50	2.00-2.10	1.95-2.05
70-80	1.85-1.95	1.95-2.05	2.20-2.30	2.20-2.30	1.90-2.00	1.85-1.95
80-100	1.75-1.85	1.85-1.95	2.00-2.10	1.95-2.05	1.60-1.70	1.70-1.80
100-120	1.50-1.60	1.60-1.70	1.60-1.70	1.60-1.70	1.45-1.55	1.45-1.55

Count/kg	29 Jul	31 Aug	30 Sep	28 Oct	30 Nov	30 Dec
30-40	3.50-3.60	3.30-3.40	3.10-3.20	3.30-3.40	3.30-3.40	3.30-3.40
40-50	2.60-2.70	2.30-2.40	2.30-2.40	2.60-2.70	2.60-2.70	2.65-2.75
50-60	2.30-2.40	2.10-2.20	2.10-2.20	2.35-2.45	2.35-2.45	2.40-2.50
60-70	2.10-2.20	1.90-2.00	1.90-2.00	2.15-2.25	2.20-2.30	2.25-2.35
70-80	1.90-2.00	1.75-1.85	1.75-1.85	1.95-2.05	2.00-2.10	2.05-2.15
80-100	1.80-1.90	1.70-1.80	1.70-1.80	1.80-1.90	1.85-1.95	1.90-2.00
100-120	1.45-1.55	1.45-1.55	1.45-1.55	1.45-1.55	1.60-1.70	1.65-1.75

Source: Price Current, Urner-Barry; the last weekly price quoted each month.

2005

*(US dollars/lb, ex-warehouse New York)*

Count/kg	27 Jan	24 Feb	31 Mar	28 Apr	31 May	30 Jun
30-40	3.35-3.45	3.60-3.70	3.60-3.70	3.60-3.70	3.60-3.70	3.80-3.90
40-50	2.65-2.75	2.75-2.85	2.75-2.85	2.75-2.85	2.75-2.85	2.95-3.05
50-60	2.40-2.50	2.45-2.55	2.45-2.55	2.45-2.55	2.45-2.55	2.50-2.60
60-70	2.15-2.25	2.20-2.30	2.20-2.30	2.10-2.20	2.10-2.20	2.15-2.25
70-80	2.05-2.15	2.00-2.10	2.00-2.10	1.90-2.00	1.80-1.90	1.85-1.95
80-100	1.90-2.00	1.85-1.95	1.85-1.95	1.80-1.90	1.70-1.80	1.70-1.80
100-120	1.65-1.75	1.65-1.75	1.65-1.75	1.65-1.75	1.60-1.70	1.60-1.70

Count/kg	28 Jul	30 Aug	29 Sep	27 Oct	29 Nov	29 Dec
30-40	3.80-3.90	3.80-3.90	3.80-3.90	3.80-3.90	3.30-3.40	3.30-3.40
40-50	2.95-3.05	2.90-3.00	2.90-3.00	2.90-3.00	2.80-2.90	2.70-2.80
50-60	2.55-2.65	2.50-2.60	2.50-2.60	2.50-2.60	2.50-2.60	2.45-2.55
60-70	2.15-2.25	2.15-2.25	2.15-2.25	2.15-2.25	2.25-2.35	2.25-2.35
70-80	1.85-1.95	1.90-2.00	2.00-2.10	2.10-2.20	2.15-2.25	2.15-2.25
80-100	1.70-1.80	1.70-1.80	1.80-1.90	1.90-2.00	1.90-2.00	1.90-2.00
100-120	1.60-1.70	1.60-1.70	1.60-1.70	1.60-1.70	1.60-1.70	1.60-1.70

*Source: Price Current, Urner-Barry; the last weekly price quoted each month.*

2006

*(US dollars/lb, ex-warehouse New York)*

Count/kg	31 Jan	28 Feb	30 Mar	27 Apr	30 May	29 Jun
30-40	3.35-3.45	3.30-3.40	3.25-3.35	3.05-3.15	3.00-3.10	3.00-3.10
40-50	2.75-2.85	2.60-2.70	2.50-2.60	2.45-2.55	2.35-2.45	2.35-2.45
50-60	2.55-2.65	2.50-2.60	2.40-2.50	2.35-2.45	2.20-2.30	2.20-2.30
60-70	2.30-2.40	2.30-2.40	2.30-2.40	2.20-2.30	2.05-2.15	2.05-2.15
70-80	2.20-2.30	2.20-2.30	2.20-2.30	2.05-2.15	1.90-2.00	1.90-2.00
80-100	1.90-2.00	1.90-2.00	1.90-2.00	1.90-2.00	1.80-1.90	1.80-1.90
100-120	1.60-1.70	1.60-1.70	1.60-1.70	1.60-1.70	1.60-1.70	1.60-1.70

Count/kg	27 Jul	31 Aug	28 Sep	31 Oct	30 Nov	28 Dec
30-40	3.00-3.10	3.00-3.10	3.20-3.30	3.15-3.25	3.15-3.25	3.05-3.15
40-50	2.35-2.45	2.45-2.55	2.65-2.75	2.50-2.60	2.45-2.55	2.45-2.55
50-60	2.25-2.35	2.30-2.40	2.35-2.45	2.25-2.35	2.20-2.30	2.20-2.30
60-70	2.05-2.15	2.10-2.20	2.25-2.35	2.15-2.25	2.10-2.20	2.10-2.20
70-80	1.90-2.00	1.90-2.00	1.95-2.05	1.90-2.00	1.90-2.00	1.90-2.00
80-100	1.80-1.90	1.80-1.90	1.90-2.00	1.85-1.95	1.85-1.95	1.85-1.95
100-120	1.60-1.70	1.60-1.70	1.70-1.80	1.65-1.75	1.65-1.75	1.65-1.75

*Source: Price Current, Urner-Barry; the last weekly price quoted each month.*

2007

*(US dollars/lb, ex-warehouse New York)*

Count/kg	30 Jan	27 Feb	29 Mar	26 Apr	31 May	28 Jun
30-40	3.05-3.15	3.05-3.15	3.05-3.15	3.05-3.15	3.05-3.15	3.10-3.20
40-50	2.45-2.55	2.45-2.55	2.40-2.50	2.40-2.50	2.40-2.50	2.65-2.75
50-60	2.20-2.30	2.20-2.30	2.10-2.20	2.10-2.20	2.10-2.20	2.10-2.20
60-70	2.10-2.20	2.10-2.20	2.05-2.15	2.00-2.10	2.00-2.10	2.00-2.10
70-80	1.90-2.00	1.90-2.00	1.85-1.95	1.85-1.95	1.85-1.95	1.85-1.95
80-100	1.85-1.95	1.85-1.95	1.75-1.85	1.75-1.85	1.75-1.85	1.75-1.85
100-120	1.65-1.75	1.65-1.75	1.65-1.75	1.65-1.75	1.65-1.75	1.65-1.75

Count/kg	31 Jul	30 Aug	27 Sep	30 Oct	29 Nov	31 Dec
30-40	3.20-3.30	3.20-3.30	3.20-3.30	3.20-3.30	3.20-3.30	3.20-3.30
40-50	2.85-2.95	2.85-2.95	2.85-2.95	2.70-2.80	2.70-2.80	2.70-2.80
50-60	2.35-2.45	2.30-2.40	2.30-2.40	2.25-2.35	2.20-2.30	2.20-2.30
60-70	2.10-2.20	2.05-2.15	2.05-2.15	2.00-2.10	2.00-2.10	2.00-2.10
70-80	1.85-1.95	1.85-1.95	1.85-1.95	1.80-1.90	1.80-1.90	1.80-1.90
80-100	1.75-1.85	1.75-1.85	1.75-1.85	1.70-1.80	1.70-1.80	1.70-1.80
100-120	1.65-1.75	1.65-1.75	1.65-1.75	1.65-1.75	1.65-1.75	1.65-1.75

*Source: Price Current, Urner-Barry; the last weekly price quoted each month.*

2008

*(US dollars/lb, ex-warehouse New York)*

Count/kg	31 Jan	28 Feb	27 Mar	29 Apr	29 May	26 Jun
30-40	3.30-3.40	3.30-3.40	3.40-3.50	3.40-3.50	3.70-3.80	3.80-3.90
40-50	2.75-2.85	2.75-2.85	2.75-2.85	2.75-2.85	3.10-3.20	3.30-3.40
50-60	2.35-2.45	2.35-2.45	2.35-2.45	2.45-2.55	2.80-2.90	3.05-3.15
60-70	2.05-2.15	2.05-2.15	2.10-2.20	2.20-2.30	2.60-2.70	2.80-2.90
70-80	1.85-1.95	1.85-1.95	1.90-2.00	1.90-2.00	2.30-2.40	2.55-2.65
80-100	1.70-1.80	1.70-1.80	1.70-1.80	1.70-1.80	2.15-2.25	2.35-2.45
100-120	1.65-1.75	1.65-1.75	1.65-1.75	1.65-1.75	1.90-2.00	

Count/kg	31 Jul	28 Aug	30 Sep	30 Oct	26 Nov	30 Dec
30-40	3.80-3.90	3.70-3.80	3.45-3.55	3.30-3.40	3.05-3.15	3.05-3.15
40-50	3.45-3.55	3.15-3.25	2.80-2.90	2.60-2.70	2.40-2.50	2.40-2.50
50-60	3.25-3.35	3.00-3.10	2.70-2.80	2.50-2.60	2.25-2.35	2.25-2.35
60-70	3.05-3.15	2.85-2.95	2.60-2.70	2.40-2.50	2.15-2.25	2.10-2.20
70-80	2.75-2.85	2.75-2.85	2.55-2.65	2.35-2.45	2.10-2.20	2.00-2.10
80-100	2.40-2.50	2.40-2.50	2.40-2.50	2.35-2.45	2.00-2.10	1.85-1.95
100-120						

*Source: Price Current, Urner-Barry; the last weekly price quoted each month.*

2009

*(US dollars/lb, ex-warehouse New York)*

Count/kg	29 Jan	26 Feb	31 Mar	30 Apr	28 May	30 Jun
30-40	3.00-3.10	3.00-3.10	3.00-3.10	3.00-3.10	2.95-3.05	3.00-3.10
40-50	2.40-2.50	2.40-2.50	2.40-2.50	2.50-2.60	2.50-2.60	2.60-2.70
50-60	2.20-2.30	2.10-2.20	2.10-2.20	2.00-2.10	2.10-2.20	2.20-2.30
60-70	2.05-2.15	1.95-2.05	1.95-2.05	1.90-2.00	1.90-2.00	2.05-2.15
70-80	1.95-2.05	1.90-2.00	1.90-2.00	1.90-1.95	1.90-1.95	1.95-2.00
80-100	1.85-1.95	1.85-1.95	1.85-1.95	1.85-1.90	1.85-1.90	1.85-1.90
100-120						

Count/kg	30 Jul	27 Aug	29 Sep			
30-40	3.05-3.15	3.05-3.15	2.95-3.05			
40-50	2.65-2.75	2.60-2.70	2.50-2.60			
50-60	2.35-2.45	2.35-2.45	2.20-2.30			
60-70	2.15-2.25	2.15-2.25	2.15-2.25			
70-80	1.95-2.00	1.95-2.00	1.95-2.00			
80-100	1.85-1.90	1.85-1.90	1.85-1.90			
100-120						

*Source: Price Current, Urner-Barry; the last weekly price quoted each month*



# Appendix E. Measures Relating to Turtle Conservation

According to the United States Department of State, Chapter 609 of United States Public Law 101–162 provides that shrimp or products from shrimp harvested with commercial fishing technology that may adversely affect certain species of sea turtles protected under United States laws and regulations may not be imported into the country unless the President certifies to Congress by 1 May 1991, and annually thereafter. The foundation of the United States programme governing the incidental taking of sea turtles in the course of shrimp harvesting is the requirement that commercial shrimp trawl vessels use TEDs, approved in accordance with standards established by the United States National Marine Fisheries Service (NMFS), in areas and at times when there is a likelihood of intercepting sea turtles. The goal of this programme is to protect sea turtle populations from further decline by reducing incidental mortality in commercial shrimp trawl operations. The chief component of the United States sea turtle conservation programme is a requirement that commercial shrimp boats use TEDs to prevent the accidental drowning of sea turtles in shrimp trawls.

On 1 May 2007, the United States Department of State certified that 16 nations had adopted programs to reduce the incidental capture of sea turtles in their shrimp fisheries, similar to the program in effect in the United States. The Department also certified that the fishing environments in 24 other countries and one economy – China, Hong Kong Special Administrative Region – do not pose a threat of incidental taking of sea turtles. Shrimp imports from any nation not certified were prohibited, effective 1 May 2007 (Federal Register, 2004). The various categories and certified countries are on the basis that:

- National sea turtle protection programs are comparable with that of the United States: Belize, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Madagascar, Mexico, Nicaragua, Nigeria, Pakistan, Panama, Suriname and the Bolivarian Republic of Venezuela;
- National fishing environments pose no danger to sea turtles because shrimping grounds are only in cold waters: Argentina, Belgium, Canada, Chile, Denmark, Finland, Germany, Iceland, Ireland, the Netherlands, New Zealand, Norway, Russian Federation, Sweden, the United Kingdom and Uruguay; and national fishing environments pose no danger to sea turtles because shrimp is only harvested using small boats with crews of fewer than five people, who use manual rather than mechanical means to retrieve nets, or catch shrimp using other methods that do not threaten sea turtles: the Bahamas, China, the Dominican Republic, Fiji, Hong Kong SAR, Jamaica, Oman, Peru and Sri Lanka.

The United States policy on TEDs is not without its critics. Many shrimp fishers outside the country are unclear as to the actual requirements, while others complain that they simply cannot afford gear similar to that used by relatively rich United States fishers. At a higher level, the Government is sometimes faulted for adopting unilateral measures that aim to compel other governments to alter their national policies to be more in line with United States objectives (Joyner and Tyler, 2000).

Source: Global Study of Shrimp Fisheries, FAO Technical Paper No. 475, 2008.